THE PRACTITIONER

No. 1115 May 1961 Volume 186

THE MONTH

The Symposium

MIDWIFERY will always remain an integral part of good family practice. Even though the mother may need to be handed over to the care of an obstetrician for her actual confinement, it is her family doctor who should be primarily responsible for her care from the date of conception to the end of the puerperium. How much of the actual management he should delegate to others, and where the actual confinement takes place, may be debatable matters, but it is the family doctor who is responsible for that continuity of care without which no mother can successfully and happily pass through the experience of childbirth. It is therefore incumbent upon the family doctor to keep abreast of treatment, and it is with this end in view that our symposium this month has been planned. The article on 'The place of the ventouse (vacuum extractor) in domiciliary practice' will perhaps evoke the widest interest, because of its novelty, but it is interesting to be reminded that this apparently new idea dates back to the days of Sir J. Y. Simpson. In view of the current, albeit misplaced, anxiety about the use of x-rays in obstetrics, the concluding article in the symposium, which deals with this problem, will be of special interest. The other articles in the symposium all deal with important aspects of the subject which are of continuing interest to all concerned with the art of obstetrics.

Human Relations

HUMAN relations is not a subject which lends itself to official reports but presumably it is one of the inevitable drawbacks of a National Health Service that a Government should feel impelled to handle this delicate subject in such a heavy-handed manner. When two such reports appear within a week of each other, even the most sympathetic of observers must begin to wonder exactly what is happening in Health Ministerial circles. Actually no two greater contrasts could be imagined.

The first ('The Pattern of the In-Patient's Day'. H.M. Stationery Office, price 2*s*.), prepared by a committee under the chairmanship of Miss M. B. Powell, the matron of St. George's Hospital, is a model of its kind. Free of clichés, civil service jargon and political casuistry, it succinctly sums up the defects in the present system and presents alternatives which would remove all the stupid habits which still linger in our hospitals as a residue of the bad old days. This it does by the simple process of putting first things —i.e. the patient—first. The dead wood of the old-fashioned system—e.g. twice-daily bed-making and temperature readings, the 'ceremonial cup of

tea' at the crack of dawn—is all discarded, and simple alternatives recommended. Not one of these would detract from the efficient treatment of patients but all would make for their comfort. The second report ('Human Relations in Obstetrics'. H.M. Stationery Office, price 6*d.*), prepared by the standing maternity and midwifery advisory committee of the central health services council, is an appalling indictment of the modern maternity hospital, couched in the most repellent of civil service jargon. Any clinician worth his salt will shiver with agony on reading that '*it does seem* that it is most important to see that the mother is received and treated kindly . . .' (the italics are ours). Even a medical student in his early clinical days would appreciate that there is no question about the importance of this elementary fact. This report is the best argument that has yet been produced against the herding of expectant mothers into maternity hospitals for mass production of their children at the hands of impersonal nurses—and, all too often, impersonal obstetricians.

G.P.s in Hospital

WHATEVER may be the final verdict on some of the recommendations in the report of the joint working party on the staffing of hospitals ('Medical Staffing Structure in the Hospital Service'. H.M. Stationery Office, price 5*s.*), there can be little doubt of its importance from the point of view of the general practitioner. 'It is in the interests of the Health Service as a whole', the report states, 'that suitably qualified general practitioners should have duties in, and a regular connexion with, hospitals'. The medical staffing structure 'should therefore provide suitable places for . . . suitably qualified doctors in other branches of medicine, especially general practice, to engage in hospital work for part of their time'.

The scope suggested for general practitioners in the hospital ranges from clinical assistants to consultants. Clinical assistantships are naturally given priority, and the specialties in which practitioners are likeliest to be of value are listed as pædiatrics, geriatrics, venereology and anæsthetics. Almost equal importance is attached to the role they could play in a supervisory capacity in casualty departments, and here they might easily attain to the proposed new rank of 'Medical Assistant'. In addition, they would continue to be employed in cottage hospitals where they would accept full responsibility for their own patients who required hospital treatment, and the authors of the report 'favour the continuation of experiments in the provision of general practitioner wards in general hospitals'. Even in obstetrics it is suggested that 'their contribution to hospital staffing might well be extended by enlisting selected general practitioner obstetricians for part-time work, in the proposed medical assistant grade, in the clinical team in other maternity units [i.e. other than general practitioner maternity hospitals], and at antenatal and postnatal clinics'. It may be going a little too far to describe this report as the 'G.P.'s Charter' but it opens up possibilities for developments of general practice such as could scarcely have been foreseen a

few years ago. It is up to general practitioners—through the medium of their College—to seize this opportunity with both hands.

Post-Mortem Cæsarean Section

OVER the past 250 years a total of 120 successful post-mortem Cæsarean sections have been reported in the world literature, according to J. W. Ritter (*J. Amer. med. Ass.*, 1961, **175**, 715) who reports two new cases himself. In one the infant died one hour after delivery, but the other child is now 4 years old, and 'displays no mental or physical defects'. The variability of the results is illustrated by two reports quoted by Ritter. In Ohio, between 1955 and 1958, 20 post-mortem Cæsarean sections were performed, with seven living infants: of these, four survived and three died within two hours of delivery. In Minnesota, on the other hand, there were no survivals among the 14 infants delivered in this way between 1950 and 1954. Stress is laid upon the importance of the operation being carried out immediately following the death of the mother. Although a living child has been obtained up to twenty minutes after maternal death, 'resuscitation problems are greatly increased if the interval exceeds five minutes'.

In an interesting historical introduction, it is noted that the earliest recorded reference to a successful post-mortem Cæsarean section is by Pliny the Elder: this was to the birth, in 237 B.C., of Scipio Africanus, the Roman general who defeated Hannibal. Pope Gregory XIV was also delivered in this way. Julius Cæsar was not born by the method so often supposed to be named after him. In his day the operation was performed only on dead women, and it is known that his mother was still alive when he was 48 years old. The operation became known as Cæsarean section because of the decree in the Lex Regia (the King's law), and subsequently in the Lex Cæsare (Emperor's law), that if a woman died while pregnant the infant was to be immediately cut out of her abdomen. In 1280 A.D., at the Council of Cologne, the Roman Catholic Church decreed that post-mortem Cæsarean section be done for the purpose of baptizing the unborn infant. The earliest record of a woman surviving Cæsarean section is said to be in 1500, when Jacob Nufer, a Swiss sow-gelder, delivered his own wife of a live child in this way. Subsequently she had four other children *per vaginam*, and died at the ripe old age of 77.

Typhoid Voirrey

FOR many generations of students 'Typhoid Mary', the cook who at the turn of the century was responsible for an outbreak of typhoid fever in each of the five families she served, was the oft-quoted classical example of a typhoid carrier. A worthy successor to her is now reported from the Isle of Man, in the form of 'Typhoid Voirrey' (Voirrey being the Manx form of Mary), by D. M. Martyn Jones and C. G. Pantin (*Monthly Bull. Minist. Hlth Lab. Serv.*, 1961, **20**, 20). Their 'account of a woman who was a typhoid carrier for more than half a century' is an admirable example of public health detective work.

Typhoid Voirrey was born and lived in the Manx village of T., and

acquired her carrier state during an outbreak of typhoid in the village in 1903. Thereafter, T. became notorious as a centre for typhoid and, although the population was only around 600, between 1900 and 1931 45 cases of enteric fever were reported from it. Typhoid Voirrey, unfortunately, was renowned for her potted meat and brawn and in due course typhoid at T. became 'associated in the inspectors' minds with Voirrey and community teas'. For how many cases the potted-meat expert was responsible is not known, but good evidence is produced that between 1932 and 1955 she was responsible for at least 22 cases. Two typical examples of her innocent machinations may be quoted. The only case of typhoid fever notified in the Island during 1933 was a young man who lived fifteen miles south of T.—but investigation revealed that he was engaged to Voirrey's daughter and was a frequent visitor at his future mother-in-law's house. The other incident that may be quoted is the final outbreak for which Voirrey was responsible, in 1955, when five cases were reported. These occurred, or the infection was acquired, in a village S. One of the victims was a filter-house attendant in the local waterworks, another was his daughter and a third was a friend of the daughter who had visited her eighteen days before going down with typhoid. At the time of the outbreak the cooking in the filter-attendant's house was being done by his mother-in-law—who turned out to be no less a person than Voirrey! This, however, was her last appearance on the typhoid scene. In 1956 she died at 'a ripe old age' and since her death no case of typhoid has occurred in the Isle of Man.

The Doctor and his Car

In spite of the fact that a large number of doctors spend a great deal of time motoring, no-one seems to have taken the trouble to find out exactly what doctors want in this respect. It may well be that their ideas on the subject may be as variegated as those of the ladies on the subject of hats—in which case there is little that the manufacturers can do to help them. On the other hand, if their wants are reasonably consistent, then there is every reason why these should be brought to the attention of the manufacturers.

It is in an attempt to settle this problem that our Motoring Correspondent has prepared the questionnaire which will be found on page A 97 of this issue. We trust that our motoring readers—both at home and abroad—will be interested enough to complete it and return it. When the answers have been analysed a summary of the findings will be sent to the Society of Motor Manufacturers and Traders.

Reciprocity

In view of the large number of people who now holiday abroad, we are reproducing in this issue (p. A 31) a copy of the summary, published in *Hansard*, which gives the relevant details concerning the reciprocal services available abroad to citizens of the United Kingdom. This gives the position on March 6, and is reproduced as it is felt that it will be of value to practitioners in advising patients who may consult them on this point.

INDICATIONS FOR THE INDUCTION OF LABOUR

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INDUCTION of labour is one of the most abused procedures in all midwifery. There would be no problem if there were any method which was not only predictably certain in its effects but also completely safe. The indications to induce labour must therefore be viewed not only against the background of the method, but the likely chances of its success within a reasonable time (i.e. forty-eight hours) and the hazards involved, especially if the induction misfires and the patient does not go into labour. The apparent triviality of the operation can easily encourage a light-hearted view of its possible consequences, so that it is undertaken without an adequate indication. The fact that medical induction may be used as a half-hearted substitute for surgical induction does not alter the need for a good reason for employing it.

As I have stressed elsewhere (Donald, 1959), 'to prescribe a medical induction which does not succeed and then to leave the patient to solve the problem for herself is both bad obstetrics and bad psychology and repeated medical inductions are no better'. If labour does not supervene, the patient herself can hardly be reassured that the original reason for interference no longer operates and she may begin to lose confidence. Once therefore the decision has been made to induce labour there should be no drawing back from the resolve to terminate the pregnancy within a reasonable time by one means or another, even, if necessary, by Cæsarean section. This is a logical outlook and imposes a good therapeutic discipline not to resort to induction without due cause.

Before the antibiotic era surgical induction positively contraindicated subsequent Cæsarean section because of the appalling risks of puerperal infection. One then thought not once but twice before inducing labour. In some ways this was a good thing and much more attention was paid to asepsis. Nowadays, surgical induction has become apparently too easy. Instruments are introduced into the uterine cavity, 'blind', usually by a sense of touch, and with all the disregard for a good surgical technique which a misplaced faith in antibiotics can too easily encourage.

HAZARDS OF INDUCTION

The indications must first be weighed against the hazards. The latter are not numerically serious, but this only emphasizes the unnecessary disasters.

The so-called simple medical induction or oil bath enema technique should be discouraged as a test of maturity. If such an induction works it can safely be assumed that the patient was on the brink of labour anyway

and did not need it, whereas if it fails she is left uncomfortable and dehydrated from purgation and only the promise of an immediate surgical induction the next day will make any sense to her.

The serious physical hazards, however, are confined to surgical induction, of which the chief risk, nay certainty, is that of infecting the uterine contents whatever the method. There now follows a race in time between the multiplication of organisms and the evacuation of the uterus. If labour does not ensue within forty-eight hours, histological evidence of placentitis is found in every case (Govan, 1961). In mild cases this may not matter much but induction is often undertaken to remove the baby from an unhealthy environment which the placental infection will hardly improve.

Maternal infection can be counteracted largely by appropriate antibiotic therapy but this is less easily achieved in the case of the fœtus. If the liquor amnii becomes infected, the baby may be born with an already established intranatal pneumonia, and other infection can reach it directly from the placenta. The newborn, especially if premature, resist infection poorly and many weeks later may find their way into pædiatric units with major manifestations of an infection which has lain dormant since discharge from the maternity unit. Because of the mounting risk of infection, the safety of subsequent Cæsarean section is greatly prejudiced by a prolonged induction/delivery interval.

Another hazard is that of prematurity. In many cases a patient's menstrual history is unreliable, so that induction for alleged postmaturity results in unintentionally premature delivery.

When an inert and prolonged labour follows it is hard not to blame the induction for the uterine dysfunction, but this is doubtless conditioned by the patient's anxiety and sometimes by the very condition for which labour is being induced, especially in genuine postmaturity. The significant duration of a prolonged labour, however, is measured from the time of rupture of the membranes, whether spontaneous or artificial. A long labour with intact membranes is on the whole a safe labour. Therefore a labour surgically induced by the standard methods of amniotomy starts at a disadvantage from this point of view.

More dramatic and immediate hazards are those of fœtal asphyxia from cord compression and prolapse. The latter is not very likely to occur if the head is well applied to the lower uterine segment, but compression of a loop of cord at some distance from the internal os can easily occur and will only be recognized by listening to the fœtal heart. Any signs of fœtal distress which follow immediately upon surgical induction should be promptly treated by Cæsarean section for which, alas, circumstances are often unsuitable, and valuable time may be lost. The outlook is also serious if malpresentation should occur, or recur, after amniotomy. This is particularly dangerous in cases rashly induced because of an unstable lie.

Hindwater amniotomy is sometimes rewarded by blood instead of liquor amnii: in other words a 'bloody tap'. This may be due to separation

of a low-lying posterior placenta, in which case the blood is maternal. Fortunately the bleeding usually stops on withdrawing the catheter, and nearly always if the forewaters are ruptured, but a continuation of bleeding may demand prompt Cæsarean section. More dangerous to the baby is the occasional tapping of fœtal blood through damage to vasa prævia. This is very uncommon but is worth bearing in mind as the baby may quickly lose more blood than he can afford, which is not much. Adult blood can be distinguished from fœtal by the alkali denaturation test which should always be carried out after a 'bloody tap'.

'Abruptio placentæ' (mixed or concealed accidental hæmorrhage) is an ugly but fortunately uncommon complication. It may follow the sudden release of very large quantities of liquor as in hydramnios. Lastly, amniotic embolism occasionally occurs after amniotomy, especially if uterine contractions are very strong and the patient manages to give herself a large infusion of amniotic fluid through a placental sinus exposed as a result of membrane rupture. This can happen in spontaneous labour too, but is much less likely.

OBSTETRIC INDICATIONS IN MATERNAL INTERESTS

The commonest indication is pre-eclamptic toxæmia. The only certain method of stopping pregnancy toxæmia is to stop the pregnancy and the sole reason for procrastination is to secure a more viable child. In fulminating cases intervention will have to be undertaken regardless of the maturity but in the average case an attempt is made to maintain pregnancy at least until the thirty-seventh or thirty-eighth week by adequate antenatal care in hospital. Thereafter there is little point in subjecting the mother to further delay. The hazards to the baby of an unnecessarily prolonged existence *in utero* in the presence of this disease are the greatest of all, but the mother herself may at any moment develop an abruptio placentæ and even well-supervised cases can suddenly get out of control and head dangerously towards eclampsia. Once eclampsia has occurred the patient will continue in great peril until delivered and for a few days after, and labour should be induced as soon as the fits have been brought properly under control. Fortunately artificial rupture of the membranes lowers the blood pressure, at least temporarily, and often provides a welcome period of grace!

Induction of labour in the management of cases of disproportion has a definite though not very prominent place. The object is to induce labour while the baby's head is still small enough and soft enough to negotiate the maternal bony pelvis. Obviously only cases of very minor disproportion are suitable and, because of possible damage to the underlying fœtal brain, it is unwise to count on moulding of the fœtal head to compensate for reduction in pelvic diameters. Unfortunately neither clinical nor radiological techniques can predict with any certainty the weight of the baby or the size of the head. Admittedly I have developed a technique of biparietal cephalometry by ultrasonic echo sounding, but this is no more than a new research

technique at present. The possibility of uterine inertia also robs the treatment of disproportion by premature induction of labour of much of its usefulness, and the technique should be reserved for multiparæ in whom inertia is uncommon and whose history of previous labours and the sizes of babies who have already negotiated the pelvis are known. Trial of induction as an alternative method to trial of spontaneous labour in cases of minor disproportion was introduced by MacLennan (1954), but he enjoined certain reservations, such as a readiness to undertake Cæsarean section at short notice, regardless of the stage of labour, for any discouraging complications such as failure of the cervix to dilate, of the head to descend or of fœtal distress. It is important in these cases never to regard Cæsarean section as an admission of defeat or one may procrastinate too long.

Hydramnios constitutes an indication for induction, even with a normal fœtus, when it is gross enough to produce pressure symptoms, provided the fœtus is mature enough to survive. Until this point is reached it is preferable to carry out paracentesis of the amniotic cavity by the abdominal route in the hope of not provoking labour, a hope often not fulfilled. When, however, as is commonly the case, there is radiological evidence of a fœtal abnormality, for example, anencephaly, it is pointless to continue the pregnancy, provided one can be certain of success in inducing the labour. For this reason the induction should not be carried out before the thirty-fourth week and not even then unless there is an appreciable degree of hydramnios, the release of which is likely to ensure the success of the operation.

Certain cases of placenta prævia call for the induction of labour by forewater amniotomy. This is usually carried out at the thirty-eighth week of pregnancy, or later, when the patient is examined under anæsthesia in an operating theatre because of antepartum hæmorrhage and in whom an anterior placenta prævia is found which has not reached beyond the nearer margin of the internal os (type I and type II). All other cases of placenta prævia are better treated by Cæsarean section.

Induction of labour in cases of proven intra-uterine fœtal death would appear to be strongly indicated on compassionate grounds alone but surgical methods of induction are particularly dangerous, because of the risks of infection with gas-forming anaerobes. Nevertheless, the retention of a dead fœtus *in utero* for more than a month carries a distinct risk of inducing hypofibrinogenæmia and an acute hæmorrhagic tendency in the mother, so that it is desirable to make serious attempts to dislodge such a pregnancy within that period. Fortunately, the standard medical induction, including the use of quinine and an intravenous oxytocin drip infusion, nearly always works, if not at the first attempt, then at the second.

The last maternal obstetric indication for induction to be considered is that of hydatidiform mole. The dangers of hæmorrhage and sepsis, to say nothing of the further risk of subsequent chorionepithelioma, justify intervention as soon as the diagnosis can be made. The present fashion is for oxytocin drip induction which has largely replaced the use of laminaria tents.

MEDICAL INDICATIONS IN MATERNAL INTERESTS

The most important of these is chronic nephritis. If disease is latent in the kidneys pregnancy will surely bring it to light and may even aggravate it. Even an attempt, in the interests of the fœtus, to maintain the pregnancy until a reasonable stage of maturity is often defeated, especially around the thirty-fourth week, by either intra-uterine death, abruptio placentæ or premature labour, or all three. The small fœtus has a very tenuous hold upon life and it requires not only great skill but also great luck to choose the right moment for inducing labour, balancing the chances of death from prematurity from those of death *in utero*.

Cases of so-called essential hypertension form a problem group. The hypertension may be grossly aggravated by superimposed pre-eclamptic toxæmia and a residual hypertension may persist long after pregnancy. The risks to the fœtus, moreover, are sufficient to discourage too conservative an attitude and certainly all cases of hypertension should be induced at term if not well before.

Pyelitis (really pyelonephritis), which is either recurrent or uncontrollable, may indicate termination of pregnancy by induction, because of the risk of ultimate renal damage. Cases of severe dyspnœa from pulmonary conditions such as bronchiectasis are often made worse by a continuing enlargement of the gravid uterus, so that induction of labour may have to be considered, but in our experience these cases are more safely treated by vigorous attention to their medical condition rather than by tampering with the pregnancy and incurring yet additional hazards. Occasionally chorea gravidarum, an uncommon but serious complication of pregnancy, may prove impossible to control by drug treatment and induction may have to be undertaken.

In the group of mother's 'interests' there remain now to be discussed what can only be regarded as social or domestic indications for induction and to condemn them roundly. There is often great pressure on the part of the patient or her relatives to get delivery completed before, for example, the impending departure of the husband abroad or some other close relative, or, on a more mundane plane, to win a whole year's income tax allowances for an extra child which is born before April 5 in any one fiscal year. The medical attendant, too, may be tempted for his own convenience to stretch a point and induce labour because of his other commitments. He need only be reminded of the possible hazards to discourage him from embarking upon a course of action which he might live to regret. Nevertheless, Theobald (1959), faced with a very serious pressure on hospital beds in Bradford, has found it necessary to employ induction over the weekends when husbands can be counted on to stay at home and look after the other children. He reserves this for multiparous patients who are going past the expected date of delivery and then discharges them home forty-eight hours after delivery if all is well. One can appreciate but also regret the circumstances necessitating this line of action. The provision of an adequate maternity service and number of beds would be a more natural solution.

FŒTAL INDICATIONS

These are nowadays every bit as important as the maternal. The majority of conditions indicating the operation for the sake of the fœtus exercise their effect through diminishing the functional reserve of the placenta. As Lennon (1957) has said, 'placental damage, once sustained, is irreversible and fœtal survival depends upon the amount of residual functional placental tissue and the fœtal maturity'. Many conditions damage or interfere with the growth of the placenta, chief among them being pre-eclamptic toxæmia and, in fact, all hypertensive conditions. The work of Browne and Veall (1953) demonstrated the reduction in the rate of clearance of radio-sodium from the chorio-decidual space in pre-eclamptic and hypertensive states of pregnancy, thus indicating a reduced maternal blood flow. Although their work does not prove the existence of a generally suspected placental insufficiency in cases of postmaturity, postmaturity is regarded by most as a potent source of placental insufficiency leading to intra-uterine asphyxia and death before or during labour.

The levels of percentage oxygen saturation in blood have been shown to fall progressively in normal pregnancy as term approaches and is passed (Walker and Turnbull, 1953).

This has been confirmed by MacKay (1957) who also showed that the arterio-venous difference in oxygen saturation of the cord blood was nevertheless between 30 and 35 per cent. from the thirty-fifth to the forty-third week of pregnancy, whether it was normal or complicated by pre-eclamptic toxæmia. What was significant was the fall in cord oxygen in pre-eclampsia which reduced the average oxygen reserve from the normal 100 per cent. at term to about 60 per cent. and that this reduction is related both to the duration and to the severity of the pre-eclamptic process. In the case of diabetic pregnancy, the percentage oxygen saturation was found by MacKay to be very low even at the thirty-sixth week of pregnancy.

For these reasons it is obvious that a combination of postmaturity and pre-eclampsia is particularly dangerous to the fœtus and no case of hypertensive disease of pregnancy should be allowed to become postmature. Even a case of apparently cured pre-eclamptic toxæmia has already suffered some placental damage and the child's oxygen reserve should be under suspicion so that labour is better induced at the thirty-eighth or thirty-ninth week or earlier.

The relationship between a low cord oxygen and postmaturity not otherwise complicated has not been confirmed by Bancroft-Livingston and Neill (1957) and the extent to which postmaturity *per se* should indicate induction of labour is still much debated. The maternal age has to be taken into account and Baird (1957) has shown the increased hazards in older primigravidæ.

Postmaturity cannot always be easily determined in a given case. It raises the two bogies of possible anatomical disproportion, which can at least be assessed, and the question of placental insufficiency which, alas, cannot. Wrigley (1958) has pointed out that there is no such thing as an exact date for delivery, any more than there is an exact height or weight for a person and he takes note of the relationship of the bulk of the baby to the amount of liquor present within the uterus, maintaining that this can only be

assessed by the same observer at each antenatal examination. Postmaturity would be liquidated as a matter of course by clinicians throughout the country were it not for the fact that they recognize that about 10 per cent. of their inductions are going to fail and some of their cases may demonstrate the hazards which have already been fully elaborated upon. The risks cannot easily be calculated but Theobald avers himself content to perform this operation one hundred times in order to save four or even two healthy babies. In my opinion, postmaturity and the failure to respond to induction are part and parcel of the same uterine dysfunction and their coexistence augurs so badly for a successful outcome of labour that Cæsarean section should be undertaken without too much ceremonial delay.

Sometimes placental insufficiency demonstrates itself even more catastrophically in the form of recurrent intra-uterine death some weeks before term. Often the cause for this cannot be pinpointed, but the history should warn one of the likelihood of an unfortunate repetition, and induction of labour, followed if it fails by readily undertaken Cæsarean section, may be the only means of securing a living child.

Isoimmunization to the Rh factor is now more commonly accepted as a positive indication for induction, especially now that the safety of exchange transfusion is so much more assured by modern technique, coupled with the improved management of prematurity. There is now a swing in favour of inducing cases of known isoimmunization of the fœtus at the thirty-sixth week and even in severe cases as early as the thirty-fourth week to forestall the development of hydrops fœtalis which is practically always fatal. If hydrops has already developed, as demonstrated radiologically, the indication for induction is more debatable since the baby cannot be saved anyway and failure of the induction cannot be followed up by Cæsarean section for the sake of a fœtus doomed in any case.

All these fœtal indications are conditioned by one form or another of suspected or anticipated placental insufficiency. There remains, however, a smaller group in which it is desirable in the baby's interests to forestall the mechanical difficulties of labour due to an unnecessarily large head. This is particularly true in the case of persistent breech presentation. Perinatal mortality in breech delivery rises gradually and then with increasing steepness with the addition of every pound over a birth weight of seven pounds. The optimum birth weight for a baby presenting by the breech is about 6½ pounds (3 kg.). Antenatal biparietal cephalometry would be a great help, but is not generally available and one can only fall back on lucky guesswork. There is much to be said for the premature induction of labour in cases of breech presentation between the thirty-eighth and fortieth week and nothing to be gained by letting them become postmature. Because of the greater vulnerability to a traumatic delivery of the softer and more premature head, however, it would be a mistake to undertake induction any earlier than the thirty-seventh week to obviate this mechanical hazard.

Diabetic pregnancy deserves special mention. As is well known the risk

of intra-uterine death begins to mount steeply after the thirty-sixth week of pregnancy and because of this there is a growing tendency to deliver practically all diabetic patients by Cæsarean section, except those lucky enough to have achieved vaginal delivery before the onset of their diabetes. In our opinion many unnecessary sections are carried out. It would matter less if fœtal survival were guaranteed by section, but the risks of atelectasis and the pulmonary syndrome of the newborn are particularly associated with diabetic Cæsarean section, even though the baby may be of considerable weight at birth. In these cases hydramnios of some degree is practically always present and there is a strong case for attempting surgical induction of labour shortly after the beginning of the thirty-sixth week of pregnancy. The release of the hydramnios makes the success of induction more likely and there is a good chance that labour will be well established within twelve hours. It is our practice therefore to rupture the membranes by forewater amniotomy and to allow the patient between twelve and eighteen hours to become well established in labour, in which case she is likely to be spared Cæsarean section. In the few cases which do not respond to this treatment, Cæsarean section is undertaken forthwith before the hazards already alluded to, together with diminishing control of her diabetic state, increase the dangers of the operation. By this practice there is little to be lost and certainly the chances of the fœtus succumbing to atelectasis would appear to be reduced as a result of vaginal delivery.

CONTRAINDICATIONS TO INDUCTION

It would be illogical to discuss the indications for inducing labour without also considering the contraindications. Obviously labour is not worth inducing if the patient is destined for Cæsarean section in almost any event. Therefore, disproportion which is more than borderline, and malpresentations associated with elderly primiparity, are ruled out straight away. Induction of labour before the thirty-sixth week of pregnancy is likely to be profitless except in cases of established eclampsia or in cases of hydramnios.

A lie which is not longitudinal is a contraindication to inducing labour. The risks of a prolapsed arm and cord or both are too high to justify it. Many authorities, however, favour rupture of the forewaters after external cephalic version in the hope that labour will then ensue and the malpresentation will not recur. Unfortunately, these very complications are much to be feared and at any moment the cord may prolapse, so it is generally regarded as preferable to keep these cases in hospital and to await the spontaneous onset of labour when the unstable lie may correct itself. It has been our experience, however, that these cases often become postmature and this introduces an added complication. If therefore induction is now embarked upon it should be carried out with the mental reservation that Cæsarean section should be performed readily if the head does not engage in the pelvis and stay there.

Cases of previous Cæsarean section do not contraindicate the induction

of labour in a subsequent pregnancy unless the operation was carried out for some immutable condition such as contracted pelvis in which a genuine trial of labour has previously failed. The presence of pelvic tumours below the presenting part obviously contraindicates any attempt at vaginal delivery.

Cases of cardiac disease are best left to go into labour spontaneously. They tend to have easy labours and not become postmature. The development of subacute bacterial endocarditis is so much to be feared that induction will seldom be justified, especially as it is rarely necessary.

Intra-uterine death of the fœtus is an absolute contraindication to surgical induction as already mentioned.

Occasionally on setting out to perform this operation the cervix is found to be so tight that even a finger cannot be passed through it. It is better in these cases not to attempt induction at least for the present until the state of the cervix is more encouraging. Although the so-called ripeness of the cervix augurs well for a successful induction an unripe cervix by no means contraindicates the operation, provided the finger can be passed through the internal os. One is often pleasantly surprised at the outcome. The use of an oxytocin drip infusion after twenty-four hours of failure to go into labour following surgical induction undoubtedly increases the success rate and reduces the hazards by shortening the induction/delivery interval. Alas, a hard core of cases still fails to respond.

CONTRAINDICATIONS TO OXYTOCIN DRIP

This is absolutely contraindicated in grand multiparity. Such cases can go into tumultuous labour within a matter of minutes and even in the presence of good supervision the uterus may rupture suddenly. I have seen a case in which the uterus ruptured after only a few millilitres of a standard dilute solution of oxytocin. Because of the danger of uterine rupture it should not be employed in cases of previous Cæsarean section, nor should it be used in the treatment of disproportion. If hydramnios is present it should not be used until the membranes have first been ruptured. Any case of oblique or transverse lie is totally unsuitable because the membranes would assuredly rupture and the cord probably prolapse. Diabetic pregnancy is a contraindication to oxytocin drip because of the tenuous hold of the fœtus upon life and the risk of precipitating intra-uterine asphyxia and stillbirth.

It is often tempting to encourage an inert labour by exhibiting oxytocin. The effect is to exaggerate the uterine pattern already existing. It should therefore not be used when the uterus appears to be hyper-irritable or colicky. Lastly, the oxytocin drip should not be used in cases of pathological rigidity of the cervix, particularly in any case which has undergone a Manchester repair or any operation involving amputation of the cervix or severe scarring. Such cases are likely to be multiparous and the uterus may contract violently and cause a serious split of the cervix and lower uterine segment.

CONCLUDING REMARKS

It might be thought from all that has been said that in our unit we are

reluctant to undertake induction of labour. This is not the case, but no induction is ever embarked upon without fully taking into account and acknowledging the likely course of action if the induction fails.

A study of the last analysed nine months' cases in 1960 shows that induction was performed in no less than 20 per cent. of cases, which is higher than most other people's figures, but it should be pointed out that, so far as possible, normal cases are filtered off to an annexe near Paisley. No less than 15.5 per cent. of all those induced ultimately required delivery by Cæsarean section as against an incidence of 10 per cent. of Cæsarean section in the hospital as a whole. Pre-eclampsia and hypertension accounted for 39 per cent. of the primary indications and postmaturity for 23 per cent. Antepartum hæmorrhage came next at 14 per cent.

The commonest reason for undertaking Cæsarean section was the appearance of fœtal distress. In this respect there is the advantage of being able to nspect the liquor for signs of meconium during labour after amniotomy.

Out of 196 cases induced in this last nine-month period the depressing number of 19 babies were lost, of whom five had major fœtal abnormalities, four were associated with abruptio placentæ, and two with eclampsia. Two babies died from less acceptable causes: one from severe fœtal distress, which could not be salvaged in time by Cæsarean section, and the other from a pneumonia contracted *in utero*; in this last case the induction was undertaken outside hospital.

In the opinion of Nixon and Smyth (1959) amniotomy shortens labour, whatever the indication, and they see no advantage whatever to labour in the presence of intact membranes. We cannot subscribe to their view that the membranes are simply a nuisance. We feel that intact membranes do much to ensure the safety of labour and that prolonged labour in such circumstances may be inconvenient but very seldom dangerous. Even great protagonists of artificial rupture of the membranes, such as Tennent and Black (1954), admit to a failed induction rate (i.e. over 72 hours), of 9 per cent. in primiparæ and 12 per cent. in multiparæ. It cannot be denied that the people with the best figures from induction are those who employ it on the most slender indications and thereby dilute their disasters with a whole flood of normality.

Before induction is ever undertaken policy should be resolved and thereafter firmly pursued, so that the situation will never become as it did when Horatio held the bridge: 'When those behind cried "forward" and those in front cried "back" '.

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THE PLACE OF THE VENTOUSE (VACUUM EXTRACTOR) IN DOMICILIARY PRACTICE

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THE vacuum extractor, or ventouse, is by no means new and as early as 1849 Simpson constructed a practical instrument with which he delivered several patients. He drew attention to the way in which limpets and cuttle fish affix themselves and pointed out that a similar arrangement 'may perhaps give us a simpler and safer obstetric power for some cases than even the forceps'. Already, in 1829, Arnott had suggested a suction tractor which might serve 'as a substitute for the steel forceps, in the hands of men who are deficient in manual dexterity, whether from inexperience or natural inaptitude'. We hope to show that, even in the hands of those experienced in the use of forceps, the vacuum extractor has inherent advantages over the forceps, which commend its use to us and appear to make it particularly suitable for domiciliary practice. Following Simpson's article (1849) a variety of instruments was designed until in 1957 Malmström described that which we have used. Their development has been well described historically by Garcia Gamboa (1960). Since about 1945 an increasing interest in the principle of the vacuum extractor has been reflected in the publication of almost a hundred papers from all parts of the world. Last year a widely attended discussion of the subject took place at the Royal Society of Medicine.

TECHNICAL DETAILS

The ventouse (fig. 1, 2) has three metal cups, 20 mm. deep and 40, 50 and 60 mm. in diameter. On the two larger cups is a small knob which can be used either to promote rotation or merely as an indicator of the position of the cup. The vacuum bottle, which is fitted with a screw-release valve, carries a manometer graduated up to 1 kg./cm.^{2} and is exhausted by means of a vacuum pump.

Mode of application.—We have described this in a previous report (Chalmers and Fothergill, 1960) as follows:—

'The largest possible cup is inserted in much the same way as a ring pessary into the birth canal and applied to the presenting part, the perineum being pressed back either with the cup or with the fingers of the other hand. With a cephalic presentation the cup should be applied as far back as possible on the head in order to promote flexion, and care must be taken that the membranes are ruptured and that neither vaginal nor cervical tissue is interposed between the scalp and the cup. An artificial caput is now raised on the presenting part by the production of a vacuum within the cup of up to 0.8 kg./cm.^{2}. This must be achieved by a gradual reduction of pressure, and six to ten minutes are usually necessary to ensure com-

plete filling of the cup by the scalp and therefore adequate adhesion. Traction is then applied in the axis of the pelvis by pulling on the traction bar with the right hand, two fingers on the left hand being used to displace the perineum, to control adhesion of the cup and, if necessary, to push the head towards the hollow of the sacrum or to promote flexion. Traction should usually coincide with pains, and delivery is completed in the usual way with or without episiotomy as required. Reduction of

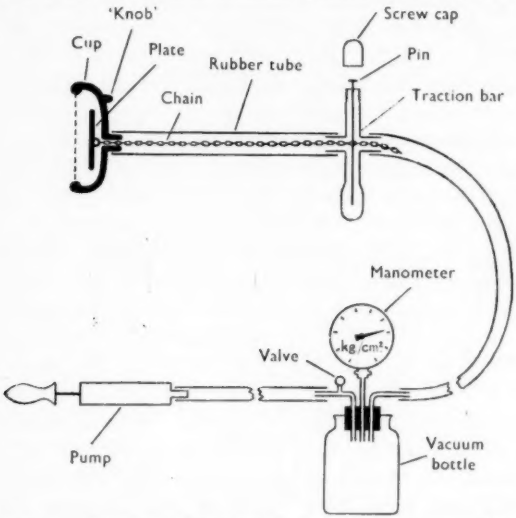

FIG. 1.—Diagram illustrating ventouse and its component parts.

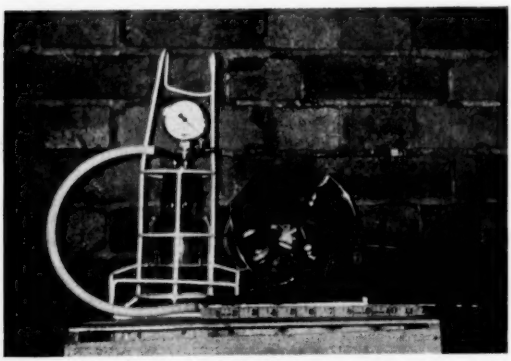

FIG. 2.—Showing how readily the appropriate parts of the ventouse fit into a saucepan for sterilizing.

pressure by opening the screw valve permits detachment of the cup from the fœtal scalp'.

Instead of the hand-pump fitted to the standard instrument, an electric pump has been used by Evelbauer (1958), Cunningham (1958) and Evans (1960). We have considered the use of a foot-pump to enable the operator

himself to control the vacuum, but in practice have found the hand-pump quite convenient and easy for the attendant midwife to use.

We have generally taken five to six minutes to obtain a vacuum of up to 0.8 kg./cm.², but Buttner (1959) with 0.9 kg./cm.² has secured adequate adhesion of the cup in three to six minutes. Failure of adhesion is unusual when familiarity with the method has been gained, but it is sometimes

Indication		No. of cases
Long first stage		33
Long second stage		100
Fœtal distress (including one cord prolapse)		38
Other *maternal* factors:		
Intrapartum accidental hæmorrhage	1	29
Elderly primigravida	1	
Placenta prævia	2	
Uterine scar (myomectomy: 1; previous Cæsarean sections: 3)	4	
Respiratory insufficiency (lobectomy)	1	
Recent laparotomy (appendicitis)	2	
Maternal distress	1	
Hysteria	3	
Cardiac lesions	3	
Pre-eclamptic toxæmia	11	
Total no. of cases		200

TABLE I.—Indications for use of ventouse in 200 deliveries.

Indication	No. of cases
Long first stage	14
Fœtal distress	27
Elderly primigravida	1
Maternal distress	1
Placenta prævia	2
Uterine scar	2
Accidental hæmorrhage	1
Toxæmia	1
	49

TABLE II.—Indications for use of ventouse in the 49 cases in which the cervix was not fully dilated in a series of 200 cases.

impossible to secure an artificial caput when intra-uterine death has occurred some hours before delivery (Lauridsen *et al.*, 1960).

We have found that the ventouse is simple for the operator to use and safe for mother and child and we cannot agree with Philipp (1958) that it should be restricted to specialist use. Barben (1958) emphasizes its safety and simplicity and believes with Bauereisen (1958) that the instrument would therefore be useful in the patient's home.

RESULTS

Our own results in 200 cases are shown in tables I to VI. These 200 cases included 154 primigravidæ. In the remaining 46, the number of previous pregnancies ranged from one to seven (1 case), the majority being in their second or third pregnancy. Table I shows that our indications for ventouse delivery are very varied, and de Azevedo and his colleagues (1960) find the method so safe that it may be used 'as a kindness to shorten labour in pusillanimous parturients'. Apart from the use of the instrument in straightforward cases, which are considered later (p. 567) with reference to their management at home, it also has some special applications. Pigeaud (1957)

regarded malrotation of the occiput as a cause of failure with ventouse deliveries, but we have found the instrument particularly applicable in this instance. In our experience rotation of the occiput from lateral or posterior positions is promoted more easily with the ventouse than by any other means and we have come to regard this as an outstanding advantage of the method. We have also found the ventouse useful in dealing with some breech presentations, but de Azevedo and his colleagues point out that the

Presenting part	Number	Remarks
Brow	3	Two corrected and delivered as vertex
Breech	4	
Vertex Occiput anterior 106 Occiput posterior 46 Occiput lateral 47	199	

TABLE III.—Presenting part and position in 200 cases in which ventouse was used at delivery. The number (206) is greater than the number of cases because of multiple births.

Position	Final method of delivery	No.	Remarks
Occiput anterior	Ventouse	97	Including two stillbirths (one delayed second twin weight 1 pound 3 ounces [540 g.], one dead *in utero* five days) and one neonatal death due to birth injury (weight 4 pounds 8 ounces [2 kg.])
	Forceps	8	Reasons for use of forceps were: Failed adhesion 5, urgent fœtal distress 1, disproportion 2. In three cases descent of vertex or dilatation of cervix was achieved before forceps were applied. There was one stillbirth (intrauterine death four hours before delivery)
	Cæsarean section	1	Disproportion
Occiput posterior	Ventouse	36	Face to pubis 14; autorotation 22
	Spontaneous	1	Failed rotation with ventouse
	Forceps	7	Reasons for use of forceps were: Failed adhesion 5, urgent fœtal distress 1, disproportion 1. In two cases forceps were used after rotation and descent with ventouse (one stillbirth—tentorial tear) and in five cases when position was face to pubis (one anoxic neonatal death—no trauma found at necropsy)
	Cæsarean section	2	Disproportion
Occiput lateral	Ventouse	41	Rotated to occiput anterior: 38; emerged lateral: 1; rotated to occiput posterior: 2
	Forceps	6	Kielland's rotation and forceps extraction: 4. After rotation and descent secured with ventouse: 2

TABLE IV.—Analysis of the 199 vertex presentations referred to in table III.

instrument is inappropriate for a complete breech. Many authors report having used the ventouse before full dilatation of the cervix and Malmström (1954) advocates this application. In our series of 200 cases the cervix was fully dilated in 151. The indications for use of the ventouse in the 49 cases in which the cervix was not fully dilated are shown in table II. Incision of the cervix is not advised because cut flaps may be sucked into the cup (Lauridsen *et al.*, 1960) and we have found that traction with the vacuum extractor will usually produce progressive dilatation without tearing the cervix.

Prolonged manual or weight traction with the ventouse has been used by various authors early in the first stage of an inert labour and Alment (1960) has described the use of this technique at St. Bartholomew's Hospital. Lillie (1960) has gone so far as to mention an 'induction-delivery procedure' in which the small cup is applied to the presenting part immediately after artificial rupture of the membranes and prolonged traction is applied until delivery occurs. Barben (1958) regards prolonged traction as 'heroic' and prefers other measures to expedite delivery. We have also hesitated to adopt this particular use of the ventouse in view of the risk of scalp necrosis from too prolonged application of the suction cup.

According to Roloff (1959), suction should not be maintained for more than forty minutes as otherwise severe lesions of the fœtal scalp are likely to occur, and Rossboth (1959) states that severe skin damage will occur if extraction is not completed within thirty minutes. Fauvet (1958) delivered 60 per cent. of his cases within half-an-hour and suggested a maximum of forty minutes' application of the cups, whilst Finkbeiner (1958) suggested a maximum of thirty minutes.

It is not clear, however, in a number of these reports whether intermittent or continuous traction is meant. We believe that the method may be used safely in cases in which delivery can be expected to take less than an hour, traction being applied simultaneously with pains.

Pigeaud (1957) apparently uses the instrument to shorten the second stage routinely and states that on an average it has been reduced by this means to thirty-five minutes. We have not used the ventouse in this manner or merely as a substitute for forceps, as for instance has von Appen (1958). We have used it largely to replace forceps, but also to extend the range of assisted vaginal deliveries. This wider field has been pioneered by Malmström (1957) and it is also referred to by Thompson (1960). Erbslöh (1958) found that the ventouse could be used 'where Cæsarean section was no longer possible but forceps not yet possible'.

De Azevedo and his colleagues (1960) reported 352 cases of ventouse delivery and had 10 failures, in two of which Cæsarean section was required, in seven forceps delivery and in the last, internal version. In 60 cases Jacobina Lacombe and her colleagues (1959) had eight failures, four being delivered abdominally and the remainder with forceps. The effect of increasing familiarity with the method is shown in Smedley's series (1960). In his first 33 cases he had 11 failures and in the second 33 there were only three failures. Both de Azevedo (1959) and Buttner (1959) emphasize

the reduction in forceps rates which has followed introduction of the ventouse. Buttner's cases were all delivered in less than 35 minutes and de Azevedo and his colleagues (1960) reported that half their cases required less than five minutes for delivery. De Azevedo (1959) reported that 75 per cent. of his first hundred cases were delivered in less than fifteen minutes and only 11 required more than thirty minutes.

CONTRAINDICATIONS

The instrument is obviously unsuitable for dealing with face presentations. We have found that when a moderate degree of disproportion occurs the ventouse is unsuccessful. If, however, assessment of the extent of disproportion is incomplete, experimental application of the ventouse may provide final evidence for a decision as to the mode of delivery in such cases. This use of the instrument as a 'trial tractor' has been referred to by Bruniquel (1958) and is analogous to 'trial of forceps'. Should disproportion occasion repeated detachment of the instrument, this is an indication that either Cæsarean section or forceps extraction is obligatory. Such a failure of the ventouse has not been found to be prejudicial to the subsequent forceps or Cæsarean delivery in any way. When fœtal distress becomes urgent forceps delivery is often quicker and Amosy and Ahlander

Indication	No. of cases
Prolapsed cord	1
Fœtal distress (cervix 2 fingers)	1
Inertia	4
With a view to Cæsarean section	
Placenta prævia 1	2
Disproportion 1	
Uncooperative	2
Forceps	5
Breech extraction	2
Exhaustion	1
	18

TABLE V.—Indications for general anæsthesia in 18 of 200 deliveries during which ventouse was used.

	No.	Remarks
Stillbirths	4	1 Dead *in utero* five days 1 Intra-uterine death four hours before delivery (forceps also used) 1 Tentorial tear (forceps also used) 1 Delayed second twin, weight 1 pound 3 ounces (540 g.)
Neonatal deaths	2	1 Fœtal distress before delivery. No post-mortem evidence of trauma—presumed anoxic death from placental insufficiency 1 Intracranial hæmorrhage, weight 4 pounds 8 ounces (2 kg.)

TABLE VI.—Cause of six perinatal deaths in a series of 200 deliveries in which ventouse was used.

(1960) therefore advocate exchanging the ventouse for forceps to secure more rapid delivery.

EFFECTS ON MOTHER AND CHILD

Maternal damage with the instrument is insignificant and this represents a considerable advantage over the forceps with which maternal soft-tissue injuries are common. Garcia Gamboa (1960) goes so far as to say that the maternal risk with the ventouse is neither more nor less than that to be anticipated with spontaneous delivery.

The effect of the instrument upon the fœtus deserves more mention. Saunders (1960) monitored the fœtal heart with a phonocardiograph during ventouse delivery and found neither acceleration nor slowing; he concluded

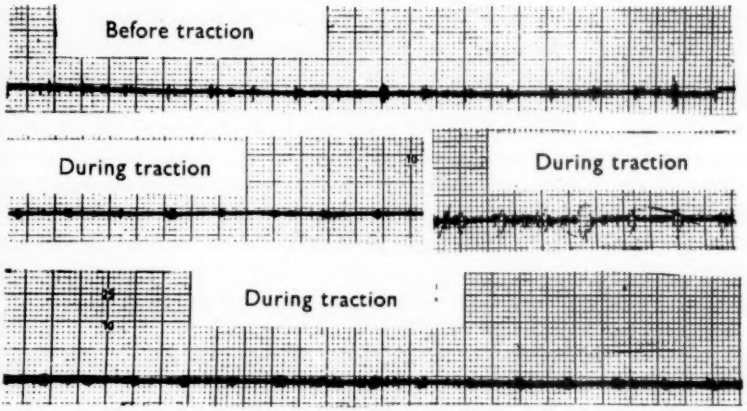

FIG. 3.—Phonocardiograph tracing of fœtal heart rate during ventouse delivery.

that vacuum extraction did not distress the fœtus. We have also used phonocardiography in 10 cases (a specimen tracing is shown in fig. 3), and we are satisfied that the fœtus is not adversely affected by vacuum extraction. This confirms the impression gained from particularly frequent auscultation with an ordinary fœtal stethoscope.

Martius (1958) states that the artificial caput succedaneum resulting from vacuum extraction is the same as a normal caput from a spontaneous delivery. Although several observers have considered the artificial caput rather formidable at first sight, all are agreed upon the striking promptitude with which this disappears. The common complication in respect of the fœtal scalp has been cephalhæmatoma.

Hochuli and Stöckli (1960) found this in 6 per cent. of their cases but all subsided without complication. Barben (1958) found cephalhæmatoma in 3.8 per cent., Amosy and Ahlander (1960) in 2.4 per cent. and de Azevedo and his colleagues (1960) in 0.9 per cent.

We ourselves have observed cephalhæmatoma in only two of our 200 cases to date.

Scalp necrosis is rare in the absence of prolonged application of the cups.

Meinrenken (1958) observes that fœtal morbidity depends upon the duration of application of the ventouse. In one of his cases there was severe scalp necrosis after five hours' application. In the one case of necrosis reported by de Azevedo and his colleagues (1960) this followed six detachments of the ventouse and sixty minutes' traction; even then it was only of minor degree.

Four of our cases have shown marked superficial scalp abrasions but in these prompt and complete healing occurred. In only one case (a recent one) have we seen patches of definite scalp necrosis, but these are healing satisfactorily at 3 weeks. Areias (1960) described a case of scalp necrosis when the instrument had been applied for fifty minutes and there had been six detachments. In our own practice we should, in all probability, have delivered such a case by an alternative method. Swellings of the eyelids and subconjunctival hæmorrhage appeared in two brow presentations delivered by Furstenberg and Soderhjelm (1960) but both infants recovered quickly and fully. These authors also attributed scalp œdema and hæmorrhage to an excessive vacuum and found cerebral irritation with red cells in the cerebrospinal fluid in four cases, but all of these recovered within a week. The only death in their series of 67 cases was in a case in which labour had lasted two days and delivery taken two hours.

Fulst (1960) made a special study of one aspect of the effects of the instrument upon the fœtus. In 380 cases of vacuum extraction retinal hæmorrhages were found in 70 (19.4 per cent.), whereas in 265 spontaneous deliveries they were apparent in 57 (21.5 per cent.). In all cases the retinal signs cleared up within a week and there was no evidence of any sequelæ.

Segschneider (1958) advised that the ventouse should not be affixed to the scalp over the anterior fontanelle, but we do not agree with this. When the position of the head is such that application at this point is requisite, we have found no harm result.

The over-all stillbirth rate may be reduced by the use of the instrument (Lauridsen *et al.*, 1960), and Snoeck (1960) had a corrected perinatal mortality of 2.9 per cent. in 410 ventouse deliveries. Hochuli and Stöckli (1960) described three deaths in 264 cases: two from intracranial hæmorrhage and one from atelectasis. Jacobina Lacombe and her colleagues (1960) had three stillbirths in 60 cases, one being macerated and one actually delivered with forceps. In the series reported by de Azevedo and his colleagues (1960) the fœtal mortality for ventouse cases was 5.18 per cent., in contrast with 7.1 per cent. for forceps deliveries. This improvement is attributed to the possibility of removing the fœtus with the ventouse from conditions of hypoxia at an earlier stage of labour than is possible with forceps.

APPLICATION TO DOMICILIARY PRACTICE

We believe that operative delivery at home should be limited in its range, to afford maximum safety to mother and infant. The extent of this limitation must vary according to the circumstances of the practice and the individual experience of the doctor concerned. In rural situations, in obstetrics as in other matters, the doctor may require more self-reliance than in many

urban practices where transfer to hospital of some patients requiring assisted delivery is easier. Careful selection of cases for home confinement should limit both the number and the type of those requiring assisted delivery at home. Primigravidæ with malpositions of the occiput, all cases of cephalo-pelvic disproportion, all malpresentations and those in whom full dilatation of the cervix has not been achieved should be transferred to hospital if the indications for assisted delivery arise. Assisted delivery at home should usually be undertaken only in patients with a fully dilated cervix and when the fœtal head is at or below the ischial spines. In these cases we believe that the vacuum extractor offers both an effective and safer method of delivery than does the obstetric forceps.

In most cases the lithotomy position has been used for our hospital deliveries but six have been delivered in the dorsal position and eight in the left lateral, three of these last in domiciliary conditions with the assistance of only a single midwife. We are satisfied that the type of case suitable for home delivery could easily be dealt with in this way. The dorsal position should be used only if the fœtal head is at the vulval orifice, otherwise the position of the patient makes it difficult to direct traction in the pelvic axis, particularly with a sagging bed.

The technique of delivery with the ventouse is easily learnt and it is less easy to harm mother and fœtus with it than with forceps. The appropriate parts of the instrument can be sterilized by boiling in a small saucepan (fig. 2) and it is easily portable. The need for anæsthesia is materially lessened with the ventouse: hence the dangerous practice of a general practitioner acting as his own general anæsthetist is no longer necessary. In the type of case mentioned, perineal infiltration for an episiotomy with 10 ml. of 0.5 per cent. lignocaine is likely to be the most that is required and in many multigravidæ no anæsthesia is needed. In our series anæsthesia was necessary in 189 cases. This was by means of pudendal block in 111, local infiltration only in 60, and by general anæsthesia in 18. The indications for general anæsthesia in these 18 cases are shown in table V.

Failure to deliver with the ventouse may occur when adhesion is defective but with proper technique and good case selection this is rare. When detachment occurs more than two or three times without advance of the head, there may be an indication for forceps or even for Cæsarean section, and hence for transfer to hospital. The condition of the mother and child following failure of an attempt at ventouse delivery contrasts sharply with that in the case of 'failed forceps'. In the former no harm should ensue either to mother or to child. Both should reach hospital in good condition with unimpaired prospects of successful application of such further treatment as may be required.

CONCLUSION

The range of application of the ventouse in hospital practice has been summarized and recent pertinent literature reviewed.

We have discussed the type of case in which the ventouse should be suit-

able for domiciliary practice. Its advantages, we believe, are such as to commend it to the general practitioner obstetrician for use both in the patient's home and in general practitioner maternity units.

We consider that the vacuum extractor can contribute notably to the reduction of maternal and fœtal mortality, which is the ultimate aim of all of us.

We are indebted to Mr. A. T. Marshall for permission to include some of his cases. The vacuum extractor referred to is manufactured by the AB Vacuum-Extractor Co., Gothenburg C, Drottninggaton 13, Sweden, and is obtainable in Great Britain, at a present price of £35, through their agents, Messrs. Allen & Hanburys Ltd.

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THE PRESENT STATUS OF CÆSAREAN SECTION

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'The art of surgery has not displaced the older art of obstetrics; it has only softened it, for it is of a gentler kind'. (Marshall, 1955.)

Over the years Cæsarean section has gradually replaced the more dangerous and mutilating manœuvres of obstetrics, saving the lives of mothers and sparing them pelvic damage and untold chronic ill health. The babies have also benefited and in certain cases section is now being used solely in the interests of the baby without undue maternal risk. With improved technique and anæsthetics and the modern developments in antibiotics and blood transfusion Cæsarean section should be no more dangerous than laparotomy.

INCIDENCE

It is because of this that the incidence of section has been gradually rising and it is true to say that at least 6 per cent. of women in hospital are now delivered by section.

The incidence of section will depend upon the type of case admitted and also on the attitude of the obstetrician. Cæsarean section is not the answer

	per cent.
Queen Charlotte's Hospital, 1951-1960	4.2
Cases from 19 hospitals, 1943-1947 (Marshall and Cox, 1949)	6.2
Middlesex Hospital, 1950-1959	7.5
Liverpool Maternity Hospital, 1953-1959	8.5

Table 1.—Percentage of deliveries by Cæsarean section.

to every obstetric hazard. Great experience is sometimes required to weigh up the dangers of a difficult vaginal delivery against the surgical risks of Cæsarean section and its possible effects on future pregnancy.

THE RISKS OF CÆSAREAN SECTION

(a) *Maternal mortality.*—Even if the risk is no greater than for laparotomy, the maternal mortality will be about ten times that of normal delivery. In practice the operation has often to be done in unfavourable circumstances, and the maternal risk seems to be in the region of 0.3 per cent. Marshall and Cox (1949) analysed 7,762 Cæsarean sections and found the maternal mortality for all sections to be 0.99 per cent., for the lower-segment operation 0.60 per cent., and for the elective lower-segment operation 0.13 per cent. The risk rises when the operation is done in labour, and in the group

with contracted pelvis and disproportion in labour for more than forty-eight hours the maternal mortality rose to 2.49 per cent.

The 'Report on Confidential Enquiries into Maternal Deaths in England and Wales 1955-57' gives a minimum estimated maternal mortality from Cæsarean section of 0.33 per cent. The immediate causes of death in the 180 cases considered were as follows:—

(1) Hæmorrhage and shock caused 24 per cent. of deaths, which is a big fall since the previous report three years before.

(2) Pulmonary embolism accounted for 18 per cent. of deaths with no improvement on the previous report.

(3) Sepsis and ileus caused 16.7 per cent. of deaths which is a rise since the previous report.

(4) Anæsthetic deaths accounted for 6.1 per cent. of the total.

(b) *Fœtal mortality.*—There is a definite risk to the fœtus which seems to be greater in the lower-segment operation. In the Marshall and Cox series (1949) the fœtal mortality was 3.29 per cent. in the elective lower-segment operation, but it is difficult to separate the risk which is inherent in the indication for the section from that due to the operation itself which is considered to be about 0.4 per cent. The uterine incision must be ample and the infant delivered with care and gentleness especially when the head is wedged in the pelvis. Inhalation of liquor may cause atelectasis and hyaline membrane so it is important to get the mouth clear as soon as possible and the pharynx can be sucked out before the head is fully delivered.

To guard against the possibility of delivering a premature baby when doing an elective section great care must be taken to check the maturity of the fœtus by the date of the last regular period, the size of the fœtus and the feel of the cervix.

(c) *The section scar in a subsequent delivery.*—The section scar may stretch and rupture in a future pregnancy and this is now the commonest type of ruptured uterus. Rupture of the classical scar is said to occur in 4 per cent. of cases (Holland, 1921) and 50 per cent. of these happen before the onset of labour, whilst the lower-segment scar is said to rupture in only 0.56 per cent. of cases and only 25 per cent. occur before labour starts (Jackson, 1959).

Dewhurst (1957) reported 762 pregnancies following classical section with a 2.2 per cent. scar rupture and in these cases there was a 5 per cent. maternal and a 75 per cent. fœtal mortality. In 1,520 cases following lower-segment section there were 0.5 per cent. ruptures but no maternal mortality and a fœtal loss of 12.5 per cent. The risk of rupture is increased by each pregnancy and vaginal delivery, by multiple pregnancy, a large fœtus, hydramnios, and by the implantation of the placenta beneath the scar.

In the United States this risk is considered so great that they practise the dictum 'Once a Cæsarean always a Cæsarean'. In this country, however, about 40 per cent. of previous sections are allowed to deliver vaginally. A repeat section will have to be done for pelvic disproportion but not necessarily where the original cause is no longer present: e.g. a placenta prævia or prolapsed cord. The patient may be allowed a trial of labour, but if this becomes difficult the trial must be ended by Cæsarean section.

Booth (1960) analysed 338 patients with a previous section or hysterotomy delivered at Queen Charlotte's Hospital from 1946 to 1956, of whom 51.8 per cent. were delivered vaginally. Of 74 patients with a classical scar 46 per cent. were delivered vaginally with 8 per cent. uterine ruptures. Of 229 patients with a lower-segment scar, 51 per cent. were delivered vaginally with only one rupture which occurred during a forceps delivery. It is only fair to say that of the six classical scar ruptures, one followed a myomectomy and three occurred before 32 weeks.

Rupture of the classical scar is dangerous to mother and child. The uterus contracts and expels the fœtus and placenta into the peritoneal cavity with perhaps severe bleeding from the placental site. This occurs into the peritoneal cavity although there may be some bleeding vaginally. The fœtus dies from separation of the placenta, compression of the cord, or maternal collapse. This rupture may occur early in pregnancy before the possibility of prevention by repeat elective section.

Rupture of the lower-segment scar is less dangerous. The fœtus is usually retained *in utero* and the placenta is rarely separated, so that bleeding is less except when the uterine vessels are torn. Ruptures occur late in pregnancy or during labour so that a repeat section at 38 weeks will usually prevent it. With a large tear of the lower segment, however, hysterectomy may be necessary. Attempts have been made to study the integrity of the scar with hysterography and it is suggested that irregular deformities indicate poor healing and a weak scar (Poidevin, 1959).

THE OPERATION

It is now generally considered that the lower-segment operation with a transverse incision into the uterine wall is the best operation, although vertical incision may be necessary to divide a contraction ring.

The incision can be accurately sutured in layers without tension and it lies in a quiet part of the uterus where healing can readily occur. Special care must be taken to suture the soft spongy wall where the incision enters the placental site; fortunately it is unlikely that the placenta will be behind the lower scar in a subsequent pregnancy with the risk of morbid adherence.

The postoperative course of the lower-segment operation is smoother. Abdominal packs keep the blood and liquor out of the peritoneal cavity and the intestines are never seen in the wound. The incision in the uterus is covered by the bladder peritoneum which seals off infection and greatly reduces the possibility of adhesions.

The lower-segment operation is strongly recommended after attempted vaginal delivery or when there is infection.

The classical section is reserved for cases in which extreme speed is essential and when the surgeon has little experience. This is especially true when large veins are seen in the lower segment and in placenta prævia, when bleeding may be excessive. It may also be used in Cæsarean myomectomy and hysterectomy.

Waters (1945) devised an extraperitoneal approach to prevent intra-uterine infection contaminating the peritoneal cavity but the operation is difficult and the peritoneum is usually opened in error. It is no longer used in this country.

THE INDICATIONS FOR CÆSAREAN SECTION

Having detailed the risks of Cæsarean section, it is now necessary to con-

sider the reasonable use of the operation. With the greater safety of abdominal delivery Cæsarean section is being used more widely and more easily in an attempt to reduce the risks to mother and child of difficult vaginal delivery. Considered use of the operation will reduce the maternal mortality and damage to the genital tract and will also lower the stillbirth rate and neonatal death rate from asphyxia and intracranial trauma.

DISPROPORTION

(a) Elective Cæsarean section will be necessary if the true conjugate diameter is less than 3.5 inches (9 cm.), or if there is marked overlap of the head at the pelvic brim. It is also indicated in less severe degrees of pelvic contraction in an elderly primigravida or when associated with an abnormal presentation, postmaturity or pre-eclampsia; or with a bad obstetric history and infertility. Provided the expected date of delivery is definite the lower-segment operation should be done a week before term. When carried out before, or within six hours of, the onset of delivery this operation is relatively safe for mother and child, the maternal mortality being 0.11 per cent. and the fœtal mortality 4.6 per cent. (Marshall and Cox, 1949).

An ovarian cyst should be removed during pregnancy as there is a risk of torsion, rupture or malignant change, apart from causing obstruction. If diagnosed late in pregnancy, preventing engagement of the head, and if it is not possible to push the cyst out of the way, a lower-segment section, followed by ovarian cystectomy, should be done. Fibroids rarely cause difficulty in labour as they get pulled up out of the pelvis with the formation of the lower segment. If this does not occur, or if the fibroid is in the cervix, a Cæsarean section will be necessary.

(b) *Failed trial of labour.*—Lower-segment section will be necessary if there is fœtal distress before the cervix is fully dilated or if there is a mechanical obstruction of labour due to a contracted pelvis, a large or malpositioned baby or a constriction ring. In these cases the mortality will increase with the duration of labour.

Marshall and Cox (1949) reported that when labour had lasted less than twenty-four hours the maternal mortality was 0.4 per cent. as for any abdominal operation; between twenty-four and forty-eight hours the mortality was 0.7 per cent., but when it had lasted over forty-eight hours it rose to 2.5 per cent. In the recent series from the Liverpool Maternity Hospital (1951-1956) 470 sections done after twenty-four hours in labour had a mortality of 0.42 per cent. (Hamilton, 1959).

A trial of labour should not be left for more than twenty-four hours if a section may be required. This decision is easy if the uterus is contracting strongly, but when there is inertia it is tempting to wait for an improvement in the uterine action.

ABNORMAL UTERINE ACTION

Section is rarely required with true uterine inertia except for failed surgical induction, but with incoordinate uterine action the lower-segment operation

has an important place when other methods have failed, and in severe cases it is necessary in about 50 per cent of cases. The possibility of disproportion must be carefully considered and if present will be an added reason for section. A rigid cervix which remains thick and two fingers dilated in spite of strong uterine contractions also calls for section. Operation will be urgently required with fœtal distress in the first stage and with a contraction ring in the second stage when this cannot be relaxed with amyl nitrite or deep general anæsthesia. It is tempting to wait overlong for an improvement in the uterine action, with the added risk to mother and fœtus, and it should be rare to allow labour to continue for more than forty-eight hours if there is a possibility of a section. Cæsarean section is safe for mother and child if not too long delayed and it is reassuring to remember that it need not necessarily be repeated in a subsequent pregnancy.

In tonic uterine contraction with a dead fœtus it may be preferable to do a section rather than risk rupture of the uterus or injury to the lower genital tract with a vaginal destructive operation.

PREVIOUS CÆSAREAN SECTION

A repeat section accounted for 13 per cent. of the total operations in the Marshall and Cox large series and compares with the much higher incidence of 35 per cent. in the United States which is due to the belief that 'once a Cæsarean always a Cæsarean'. The risk of an elective repeat section is probably ten times greater than a normal vaginal delivery and should be done only when there is some definite reason, such as previous classical section, infection in the uterine wound, or the probability of an obstetric difficulty.

All patients with a scar in the uterus must be delivered in hospital. Pain or tenderness over the scar may indicate stretching and necessitates immediate admission to hospital in view of the possibility of a repeat section being required. As a classical scar may rupture early in pregnancy before it is reasonable to do an elective section, it has been suggested that such a patient should be admitted to hospital at the 28th week for careful observation and that an elective repeat section be done at 36 weeks or before if there is pain or tenderness in the scar. The placenta may be localized by placentography and special care taken if the placenta lies behind the scar. Patients with a lower-segment scar are less likely to rupture and it is uncommon for this to happen before labour begins. They should, however, be admitted to hospital a week before term and the blood cross-matched.

During labour the fœtal and maternal heart rates are carefully recorded and excessive lower abdominal pain or tenderness or vaginal bleeding is reported at once as suggesting rupture. If at all prolonged the second stage should be ended with forceps. In all these vaginal deliveries the cavity of the uterus should be carefully explored to exclude a tear.

The lower segment is weakened by repeated sections and sterilization

88 per cent. fœtal survival rate when section was used in these severe cases. The outlook for mother and child is worsened by the onset of fits, but if the child is still alive and if the mother has only had one or two fits there is no reason to deprive them of this treatment. If the child is dead the problem is not so urgent and the eclampsia can be treated conservatively.

DIABETES MELLITUS AND HEART DISEASE

Diabetes mellitus.—Cæsarean section is the safest method of delivery for mother and child in all severe cases of diabetes.

Peel and Oakley (1949) reported that 75 per cent. of their diabetic mothers were delivered by the abdominal route and in their 213 cases the fœtal loss was 16 per cent. with no maternal deaths. The fœtal mortality was about half that in the vaginal delivery group.

The maternal environment becomes increasingly dangerous for the baby in the last six weeks of pregnancy and Cæsarean section should be done at 37 weeks, or before that if there is toxæmia, hydramnios or a previous intrauterine death at an early date. A surgical induction is reasonable in a multipara with a good obstetric history, a small baby and well-controlled diabetes.

Heart disease.—The majority of cardiac patients have an easy spontaneous labour. The 'Report on Confidential Enquiries into Maternal Deaths, 1955-57' drew special attention to the high mortality following Cæsarean section in heart disease (8.8 per cent. of cardiac deaths). The sudden closure of the utero-placental circulation will embarrass the right heart, whilst the risks of postoperative chest complications and pulmonary embolism are increased. It should not be done unless there is the probability of a long or difficult labour as with disproportion, malpresentation, uterine inertia or toxæmia. There is no place for a trial of labour. On occasions, after consultation with a cardiologist, it may be decided to do a section at the ideal moment on a patient with low cardiac reserve and hæmoptysis, to avoid pulmonary œdema.

RHESUS INCOMPATIBILITY

Premature delivery and prompt exchange transfusion are recommended in expectant mothers with Rh antibodies who have already had a stillbirth due to hæmolytic disease or in whom the antibody titre is high (indirect antiglobulin titre greater than 1/256). Elective Cæsarean section is preferred to an unreliable surgical induction, and the premature baby is spared the risks of birth trauma made more dangerous by the marked hæmorrhagic tendency which they show. Exact timing is possible and the Rhesus team of obstetrician, pædiatrician and hæmatologist is fully prepared (Hart, Jackson and Stewart, 1959).

PREVIOUS VAGINAL REPAIR OPERATION

A vaginal delivery after a repair operation is bound to cause pelvic damage which can only be prevented by Cæsarean section. It must be considered

after a successful vaginal repair and it is certainly indicated following the repair of a vesico-vaginal fistula or cure of stress incontinence by a buttress or sling operation. An elective section will prevent what may be a long first stage from a rigid cervix and damage to the vagina and the bladder neck which will be more difficult to repair on the second occasion.

CONCLUSION

We have considered the advantages and disadvantages of Cæsarean section, but when all is said and done the only criterion is the safety and health of the mother and child. The old-fashioned prejudice that Cæsarean section was an obstetric failure has now been overcome, and there is no doubt that the section rate is rising and will continue to rise with benefit to mother and child. On the other hand, there is a definite operative risk to mother and child and a shadow over any future pregnancy. Operative and anæsthetic techniques must be improved and full use made of the modern aids to surgery such as blood transfusion, antibiotics and correction of blood chemistry. Even more important, however, is the experience and intuition required to know if and when a section should be done.

The art of surgery may be necessary to perform what may be a difficult Cæsarean section, but to decide if this is necessary and to choose the ideal moment to deliver the child is surely the art of obstetrics.

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THE PROBLEM OF UTERINE INERTIA

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UTERINE inertia is a term hallowed by time and tradition. So long has it been used that its meaning has been largely lost until now it is applied to any patient whose labour is longer than usual. What length is usual is anybody's guess.

In this article it is proposed to discuss the problem of abnormal uterine action irrespective of whether this leads to a longer or a shorter labour and irrespective of whether the uterus is inert or unduly active. Fundamentally, labour can be divided into three processes involving the fœtus, the birth canal, and the action of the uterine muscle. It would be satisfying to consider that abnormalities of labour could also be divided according to these three basic processes but all too often the three are inextricably mixed. It is true that in many cases a single cause of the abnormal labour is at the bottom of the trouble, but usually the abnormality of, say, the birth canal begets an abnormal fœtal presentation and in labour these two always lead to more or less abnormal uterine action. In this discussion therefore it will often be necessary to draw attention to the probability of some other obstetric abnormality being present either causing or perpetuating the abnormal uterine action. It is also true, however, that some types of abnormal uterine action appear to be spontaneous—at least within the limits of our knowledge.

The uterine muscle is in action before the first stage of labour, during the first, second and third stages and after the third stage of labour. Contractions occurring during late pregnancy may well have some bearing on this problem but on the whole are best not considered. Abnormal uterine action during and after the third stage of labour is the special problem of third-stage hæmorrhage and retention of the placenta and again will not be considered. In other words, the main discussion will centre on uterine action during the first stage of labour, and some of what will be said will be applicable to the second stage.

NORMAL UTERINE ACTION

Much work has been done in recent years to elucidate the muscular action of the normal uterus. The hardness of the uterus has been measured by abdominal palpation; the electrical discharges of the muscle have been measured; contractions of different parts of the uterus have been noted by means of needles in the muscle or delicate tambours on the abdominal wall. Measurement of a uterine contraction, however, is still a matter of some difficulty and is not yet possible in every teaching hospital, although it should be, let alone in non-teaching hospitals. It is therefore not practical to speak of such measurement in everyday clinical practice.

Experimental work has shown what a normal uterine contraction in labour

is like and it is interesting to note that clinicians of many years ago had already given us a very reasonable, though less scientific, idea. Such a contraction starts simultaneously at each utero-tubal junction, whence waves pass inwards to meet in the midline and continue downwards as one. The contraction is strong in the fundus of the uterus, less strong in the mid-zone and weak in the lower segment. This gradient of activity is what is known as polarity and is the prime cause of dilatation of the cervix. This is the normal uterine contraction in labour. The contractions in pregnancy are different in that they are of similar strength in all three zones of the uterus and, moreover, there is no retraction. The length and strength of these normal contractions will depend upon the progress of the labour. They will be short and weak early in the first stage and will gradually lengthen and strengthen as labour advances.

It is presumed that the pain of uterine contractions is due in some measure to the pressure built up inside the uterus. The resting pressure is said to be about 5 millimetres of mercury and pain is said to be felt at about 25 millimetres of mercury. Obviously this will vary greatly according to the temperament of the woman. It will be seen therefore that a contraction must start and the pressure must increase quite appreciably before the pain threshold is reached. Similarly at the end of the contraction wave pain will cease before the contraction has completely subsided. Clinically this is a most important observation and the diagnosis may often depend upon the relation of pain to the onset and end of a contraction.

The borderline between the normal and the abnormal is difficult to define, since the yardstick is still the result of the labour and not the evidence of a measuring machine. Thus, so long as a uterus is efficient at its job, even though this efficiency may depend on other factors, it is regarded as normal.

FACTORS ASSOCIATED WITH ABNORMAL UTERINE ACTION

The vast majority of cases of abnormal uterine action occur in primigravidæ. There are a few rare cases associated with multiparity but otherwise it can be said that if a woman has had labour pains before, she will not have abnormal action in a subsequent pregnancy. This is true even if the previous labour was terminated by Cæsarean section before the end of the first stage.

In a large number of cases there is an associated obstetric abnormality, either disproportion or a malpresentation, especially an occipito-posterior position. Both these will have the effect of removing the well-fitting presenting part and it is this which seems to be of the greatest value in causing normal uterine contractions. The forewaters appear to have no such function and their presence or absence is immaterial.

After all these years it is surely unnecessary to go further into the role of fear in the production of abnormal uterine action. Everybody knows how important it is—both the obvious external fear and the long-suppressed fear which is so often covered by bravado. All practitioners of midwifery are assiduous in their efforts to overcome it, but their efforts must of necessity

be governed to some extent by the circumstances in which they work.

It is doubtful whether the incidence of abnormal uterine action increases with age. It may do, but close scrutiny of cases tends to deny this impression, for impression it has certainly been. More important is the constitutional make-up of the woman; the hairy, heavily built infertile woman is typical, culminating in the dystrophia dystocia syndrome.

Undue stretching of the uterine muscle, as in twins or hydramnios, and fibroids appear to have no importance in the etiology of this condition, although much has been written on these lines in the past.

There are almost as many classifications of abnormal uterine action as there are articles or books on the subject. They are all as good or as bad as each other. The classification used here is a purely practical one.

THE UNDERACTIVE UTERUS

This is the only true inertia. The uterus is only feebly active in all areas. Polarity appears to be normal but the contractions are not only very mild but they come at widely spaced or irregular intervals. The pain is only slight. It may be difficult to say whether or not the patient is in labour. In a word, she is 'niggling'. The important thing is to note the very low tone in the wall of the uterus between contractions. Any evidence of increased uterine tone immediately invalidates the diagnosis of an underactive uterus. As a result of these desultory contractions there may be some advance in the labour as evidenced by dilatation of the cervix. The membranes are nearly always intact. The labour appears otherwise to be normal. It is very unusual for the fœtus to show any signs of distress, and the same applies to the mother, except from the point of view of her morale. Often the uterus suddenly begins to work properly without any treatment, and it is difficult therefore to be sure whether one's ministrations have been successful or merely well timed.

THE OVERACTIVE UTERUS

In these cases the uterine muscle is working harder than normal. The character of the contractions may be normal but is more often abnormal.

Precipitate labour.—If the overactive uterus has contractions of normal character, an unduly quick labour is often the result. As many of these women are multiparæ, the laxity of the soft tissues will help to decrease the length of labour. It is difficult to look upon this situation as abnormal but it is, and every now and again it is attended by ill effects. The mother may suffer severe lacerations of the birth canal due to the speed of descent of the baby, but, much more important, the baby may suffer intracranial damage due to the very swift moulding and occasionally he may show the typical tentorial tear more often seen after a breech delivery.

Hypertonic incoordinate uterine action.—This clumsy circumlocution is unfortunately the best descriptive term of what is, from a practical point of view, the most important abnormality of uterine action. It is quite common and well known as an accompaniment of an occipito-posterior position.

Other obstetric abnormalities may be present and should be looked for. This is a *painful* labour. The contractions are frequent, regular or irregular, and on palpation appear to be strong. The uterus relaxes poorly between contractions. The patient not only feels pain during the contraction, but the pain starts as soon as the contraction is palpable and persists until the contraction ceases. This is quite different from the normal state of affairs. Many patients complain of a continuous backache even between contractions. The explanation may be that the high uterine tone raises the intra-uterine pressure very near to the pain threshold. In some cases it may even be above it. Then a contraction is, of course, painful immediately, since the slightest increase in intra-uterine pressure will cause pain.

The labour progresses very slowly, if at all, in spite of the overworking uterus. The membranes always rupture early and the cervix dilates but slowly, if at all. The contractions of the uterus are abnormal and polarity may be lost, so that tone may be high in the lower segment, which may well cause backache, while it is low in the mid and upper zones. As a further example of the disturbance of the autonomic nervous system there may be retention of urine, not due to pressure of the head, and sometimes bowel spasm, giving the patient a desire to push long before she is fully dilated.

The effect on the patient of this type of abnormal uterine action is profound. Her physical and mental condition deteriorates rapidly, however carefully one tries to prevent this. Dehydration adds to her troubles. Soon the pulse and temperature begin to rise and she is on the slippery downhill path of severe maternal distress. The baby, too, is not unaffected. With the rupture of the membranes he is more at risk and the high tone of the uterine muscle causes ischæmia of the placental site. This leads to fœtal asphyxia which may come the quicker for the fact that often these patients are over their dates. The clinical picture then is of advancing maternal and fœtal distress in labour, with the latter progressing little if at all.

THE RARE TYPES OF ABNORMAL UTERINE ACTION

These are listed separately so that they may not cause confusion. None of us sees them with any frequency nowadays; indeed it is right that we should not, but the practitioner will wish to know how they can arise.

Bandl's ring.—This occurs as a result of insuperable obstruction in labour in a multiparous patient. The uterus contracts normally but more and more strongly until the upper segment goes into a state of extreme retraction and almost continuous contraction. Pain is now continuous. The junction between the flaccid and abnormally thin lower segment and the tightly contracted upper segment is the retraction ring of Bandl. It is easily palpable and even visible through the anterior abdominal wall. Unless treated the condition will proceed to rupture of the uterus. With the extreme retraction at the placental site the fœtus is, of course, dead.

Generalized tonic contraction of the uterus.—This occurs when there is insuperable obstruction in labour in a primigravida. The uterus goes into a

state of hypertonus without intermittent contractions, and this may occur before a lower segment is obvious, or later when the lower segment is more or less demarcated. Rupture of the uterus is again a risk, but less so than with Bandl's ring. The fœtus dies as a result of the hypertonus at the placental site.

Contraction or constriction ring.—Usually this is the result of stimulation of a uterus, already the seat of incoordinate action, by intra-uterine manipulation or treatment with oxytocin. The constriction is usually at the junction of the upper and lower segment and can only be diagnosed by internal palpation. The diagnosis is commonly made during a forceps delivery, when traction does not result in descent. The ring can be felt encircling the baby's neck.

Rigid cervix or cervical dystocia.—Very rarely a cervix does not dilate as a result of fibrosis following a Manchester repair or cauterization of the cervix. It also appears to occur spontaneously although diagnosis from slow dilatation of the cervix during other abnormalities of uterine action is very difficult. It is doubtful if its recognition serves any useful purpose, for treatment will be instituted for the lack of progress of the labour irrespective of its cause.

TREATMENT

To avoid a rather dreary list of conditions and their treatment, it is proposed first to mention some general principles followed by certain more important and specific points.

General principles.—It must never be forgotten that the object of this whole exercise is the birth of a baby—and a live baby. Conservatism is much to be hoped for, because it seems futile to put a scar in a uterus when there is no obstruction to delivery in this labour and when one knows the uterus will work perfectly well next time. To do a Cæsarean section in such a case would appear to put an unnecessary limit on the patient's family. Conversely, however, a long and painful labour may be a more profound cause of limitation of a family than a scar in the uterus, and if that long labour finishes with a dead baby then the psychological trauma to the mother is indeed far-reaching. Lastly it must be remembered that Cæsarean section has still eight times the mortality of normal delivery.

Removal to hospital.—For a consultant to advise a general practitioner on domiciliary work borders almost on impertinence, but one must stress the importance of early transference of a patient with abnormal uterine action to hospital. It is pointless to enumerate the advantages of a hospital in the management of such cases, but they are overwhelming. Much more important, however, is the advantage that the hospital doctor enjoys of being insulated from the pressure of the relatives. This is something with which the general practitioner always has to contend and it may well be a wholly impossible burden on top of the worry of an already abnormal case. He may be forced into interference which he knows to be unwise and in midwifery that spells danger.

General condition of the patient.—During the long labour that may attend abnormal uterine action it is essential to bolster up the physical and mental condition of the patient. Here the physical presence of an attendant can be of the utmost importance, coupled with continual reassurance and adequate sedation. In this context morphine is probably the most useful drug at our disposal. Food is of little importance but hydration is paramount. Especially in cases of incoordinate uterine action, so often associated with a posterior position, the patient can become dehydrated at a frightening rate. It is incorrect to withhold fluids for fear of a subsequent anæsthetic; the immediate danger is too great. Nevertheless, dehydration often becomes manifest and in such cases an intravenous drip of glucose-saline is essential and may make all the difference to the outcome of the labour. In many of these cases the membranes have been ruptured for some time and it is a wise precaution to give prophylactic antibiotics. This may well be lifesaving to the fœtus. Personally, I use a mixture of penicillin and streptomycin directly the membranes have been ruptured for forty-eight hours.

Oxytocin.—The underactive uterus will nearly always work properly in the end, but much patience may be necessary from both patient and doctor. Provided it is certain that this is indeed an underactive uterus, it is permissible to give oxytocin: in a drip, one unit to a litre of glucose solution, the rate of infusion to be slow to begin with. It is never wise to leave the patient who is under such treatment. It must be emphasized that the penalties for using oxytocin in any but the underactive type of abnormal uterine action are very great, so great that many prefer not to take the risk.

The ventouse.—There is no doubt that there is a definite place for the use of this instrument, reported on elsewhere in this symposium (p. 559), in accelerating the first stage of labour, when uterine contractions are not normal. More work has still to be done before its advantages or otherwise are thoroughly understood, but again it is the underactive uterus which will most likely be helped. Intra-uterine manipulation in cases of incoordinate action is likely to lead to far more trouble than it is worth.

Cæsarean section.—There is little doubt that treatment in abnormal uterine action, putting on one side the underactive uterus which probably gets better any way, resolves in the end to vaginal delivery, if the mother and the baby hold out, or Cæsarean section. It is impossible to lay down rules, for every patient is a separate problem but, whilst in the past it was the mother who was usually the reason for the section, nowadays it is much more often the baby. The operation itself has now become so standard that any other operative procedure is unlikely to be worth while. Even in the rare case of obstructed labour with a dead baby, Cæsarean section is preferable in this day and age to a destructive operation, which so few people have ever performed.

No references have been given in this article although obviously most of the information contained therein is the result of other people's work. I must, however, acknowledge with gratitude how much my thinking about this subject has been influenced by the writings of Professor T. N. A. Jeffcoate.

THE CARE OF THE PUERPERAL MOTHER

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CARE of the puerperal mother begins as soon as the placenta has been delivered and lasts until the postnatal examination has been made six or eight weeks after delivery. For the mother this is a time of adjustment and rehabilitation. The genital organs return to their pre-pregnant state and a new endocrine balance is achieved as lactation is established. Responsibility for the new baby and the return to household duties and marital relations bring many emotional problems for the mother. This is an important time for the family and the general practitioner can be of great assistance.

REST

The physical stress of labour and the excitement of seeing and handling the baby result in some degree of mental and physical fatigue in most cases. Adequate rest is essential during the early days of the puerperium but this is difficult to achieve. Many mothers confined in hospital complain bitterly of the early hour at which they are awakened, of the never-ending round of feeds, meals, washes and visits and of their inability to sleep in the afternoon midst the bustle of a busy hospital. The mother who has her baby at home is spared many of these problems but meets others equally disturbing. With the best of domestic help she may well find herself deeply involved in family responsibilities within a few hours of delivery and there is a great temptation to be up and about doing household duties far too soon. Whether the confinement is at home or in hospital, doctor and nurse should make every effort to ensure for the mother a period of quiet and rest and freedom from anxiety. It may be necessary for the practitioner to prescribe a mild sedative for the first few nights of the puerperium. Amylobarbitone sodium, 3 grains (200 mg.), is generally adequate.

It was at one time customary for patients to remain in bed for up to a fortnight after confinement but this unphysiological state of affairs has happily passed. After normal confinement the mother should be encouraged on the second day to get up and sit on a chair while the bed is being made. By the third day she should be allowed to walk to the lavatory and a bath is welcomed by all patients at this stage.

Visitors.—It is understandable that friends and relations should want to see the mother and her new baby but some reasonable limit must be placed upon the number of visitors and the length of time they are allowed to spend with the mother. An hour a day is generally sufficient and the reason for this limitation will be readily appreciated by the mother and her friends.

Visitors who have respiratory infections should not be allowed to see mother or baby.

VULVAL TOILET, BOWELS, AND MICTURITION

Vulval toilet.—The genital tract during the puerperium is very susceptible to infection and every care should be taken to prevent this serious complication. When the perineum is exposed those in attendance must wear masks. The perineum and vulva should be swabbed twice daily with a weak solution of 'dettol', 'roccal' or 'savlon'. The swabbing should be done from above downwards so avoiding contamination from the rectum. Nurse must, of course, wash her hands thoroughly before attending to the vulval toilet. It is a great comfort for the patient to be allowed to sit in the bath for a few minutes from the third or fourth day onwards. Perineal stitches are removed on the sixth or seventh day after delivery.

Bowels.—There is a tendency to constipation throughout pregnancy and this may be aggravated in the puerperium by painful lesions on the perineum. Many patients require a mild aperient such as cascara or senna on the second night, followed by an enema on the morning of the third day. A glycerin suppository will help ease the pain of a torn perineum.

Micturition.—Very careful attention should be paid to bladder function in the early part of the puerperium, for complete or partial retention of urine is not unusual during the first few days after delivery. It is good practice for nurse to keep a record of the urinary output during the first forty-eight hours. At the same time the lower abdomen should be examined carefully for evidence of bladder distension. It is not widely appreciated that the bladder can distend painlessly in the puerperium and overflow incontinence may be mistaken for normal micturition. This complication is better avoided for in these circumstances bladder muscle tone may take several weeks to recover. If it is suspected that the bladder is not being properly emptied a catheter should be passed after urine has been voided. More than 4 ounces (115 ml.) of residual urine is an indication for test catheterization night and morning until the patient is capable of emptying the bladder. At the same time the patient should have one of the sulphonamides, e.g. trisulphonamide tablets B.P.C., two thrice daily for five or six days.

PUERPERAL INFECTION

Puerperal infection, particularly of the genital tract, does not now carry the threat to the life of the mother that it did twenty-five years ago. Many factors have contributed to this dramatic victory: better health of the mothers, improved antenatal supervision, better obstetric practice, ready availability of blood and the discovery first of the sulphonamides and more recently of the antibiotic group of drugs.

Careful recording of the mother's temperature and pulse rate, the fundal height and lochial discharge will give the doctor warning of an infection. A methodical search, clinical and bacteriological, should be made for the source of the infection before any treatment is given.

Calman and Gibson (1953), in their study of 188 cases of notifiable pyrexia, found that 29 per cent. were urinary, 26 per cent. genital, 16 per cent. non-obstetrical and no cause was found in 17 per cent.

Many standard textbooks contain excellent accounts of the present situation in regard to the investigation and management of puerperal infection: e.g. 'The Queen Charlotte's Textbook of Obstetrics' and 'British Obstetric and Gynæcological Practice'.

EXERCISES

There may well be doubt in the minds of many people about the value of relaxation and exercises in the antenatal period but there is no doubt that exercises are helpful in the puerperium. In hospital the physiotherapist makes her round daily and mothers are given graduated exercises. These are begun the day after delivery and are designed to improve muscle tone, reduce the risk of venous stasis and instruct the patient in correct posture. A number of small inexpensive books has been published in recent years for the guidance of patients: e.g. that by Eileen Montgomery (1959).

BREAST CARE AND BREAST FEEDING

For the patient who breast feeds successfully there is a deep sense of purpose and achievement and there is much that can be done antenatally and during the early days of the puerperium to ensure efficient lactation. It is, however, most important that those in attendance should not allow their clinical judgment to be swayed by emotional considerations. In spite of all preparation some mothers are incapable of breast feeding satisfactorily and others clearly do not wish to do so. It is a great mistake and a source of much distress if breast feeding is pushed in these cases.

In a series of communications Waller (1946, 1950, 1959) set down the measures employed at the British Hospital for Mothers and Babies, Woolwich, to ensure successful breast feeding. His views have gained wide acceptance and have been supported by a controlled experiment carried out at Guy's Hospital by Blaikley and his colleagues (1953). Waller argued that many lactational failures were due to continued over-distension of the breasts in the first week of the puerperium and that this overfilling could be prevented by certain measures applied during pregnancy and during the early part of the lying-in period. For retracted, immobile nipples Waller devised simple 'shells' to be worn under the brassière throughout pregnancy; gradually and steadily the retracted nipple becomes protractile. During the last six or eight weeks of pregnancy Waller advised his patients to express the colostrum from the breast daily. In the lying-in period his aim was to prevent breast engorgement and he encouraged his patients to express residual milk from the breasts after each feed. When engorgement did appear in spite of this treatment he prescribed 15 mg. of stilbœstrol, to be followed after four hours by another 10 mg. This prevented further rise in breast tension and allowed more successful expression.

Waller preferred that his patients be given individual instruction in

breast expression by a sister experienced in his techniques and undoubtedly this factor had a great deal to do with the success of his methods in Woolwich. Both Waller and Blaikley have reported a high incidence of successful breast feeding up to six months after delivery and at the same time have noted a low incidence of breast complications.

BREAST INFECTION

An infection of the breast is probably the most harrowing experience associated with childbirth. Provided the earliest symptoms are recognized and treatment begun at once there is every chance that severe infection will be avoided. Breast engorgement should not be allowed to continue to the stage when the outflow of milk is obstructed and œdema appears. Stilbœstrol and expression should be begun before this stage is reached. Unless there is obvious infection the baby should be allowed to continue at the breast. When there is a flushed indurated quadrant it is better to take the baby off the breast and give the mother large doses of stilbœstrol: 15 to 30 mg. in twenty-four hours. This will help to reduce engorgement and allow milk drainage. Antibiotic therapy should be begun at once. The organism is most likely to be the *Staphylococcus aureus* and as penicillin resistance is high it is advisable to give chlortetracycline or chloramphenicol, 250 mg. six-hourly for five to six days. If the infection be caught at an early stage and treated effectively it may well regress. Breast expression can gently be resumed and in a day or two the baby can go back to the breast.

If pain and induration persist over forty-eight hours and the overlying skin becomes œdematous, an abscess is forming and surgical drainage must be carried out under a general anæsthetic. This treatment should not be delayed. In these circumstances it is better to suppress lactation and put the baby on to bottle feeds.

The common route of infection in the puerperal breast is a cracked nipple. For this condition Waller advised 1 per cent. yellow oxide of mercury on a sterile dressing. This he preferred to Friar's balsam which tended, in his experience, to glue the nipple to the dressing. The baby should be taken off the breast temporarily and expression employed until the crack has healed. The expressed milk can be given to the baby. It is a great mistake to put the baby back on to the breast before the crack has healed completely. The wound will simply open up again and there is a real risk of infection gaining entry to the breast tissue.

PSYCHIATRIC DISORDERS IN THE PUERPERIUM

Minor psychiatric upsets are common during pregnancy and the puerperium but few women are seriously disturbed. It has been estimated by Hemphill (1952) that between one and two out of every 1000 pregnant women become psychotic during pregnancy or within six months of delivery. Of this number, some 10 per cent. occur during the pregnancy and the remainder some time after delivery (Bamford, 1934). Insomnia, depression

and confusional states should put the doctor on his guard. There may be a personal or close family history of mental disease and such patients should be observed very carefully. If the practitioner has the slightest suspicion about the development of a puerperal psychosis he would be well advised to have the patient seen in consultation by a psychiatrist. As James (1959) has pointed out, the earlier the condition is diagnosed and treatment begun the more hopeful is the prognosis.

DISCHARGE OF PATIENTS FROM HOSPITAL

When confinement takes place in hospital there is much to be said in favour of allowing mother and baby home forty-eight hours after delivery, provided there are no complications. The danger period for mother and baby is then largely over and there is probably less risk of infection at home. If the mother is to be allowed home at this early stage, however, she must have adequate domiciliary help and this should be checked before the arrangement for early discharge is made. There must be continuity of care in these cases and a very favourable arrangement has been reached in Newcastle upon Tyne.

Patients for early discharge from the Princess Mary Maternity Hospital are selected at the time of their first antenatal visit and their names are passed to the city medical officer of health who arranges for a domiciliary midwife to visit the patient's home. If the home circumstances are satisfactory then the arrangement is confirmed and the midwife calls at intervals during the antenatal period and gets to know the patient and makes certain that everything is in order for a smooth transfer of responsibility when the patient is discharged forty-eight hours after delivery in hospital. A limited number of normal cases are dealt with in this way each year and, provided the cases are carefully selected, unsuspected complications are most unusual.

THE POSTNATAL VISIT

Whereas the importance of antenatal care is widely accepted and most pregnant women attend regularly, the same cannot be said for postnatal care. A much smaller percentage of women attend the postnatal clinic. There is no reason why the family doctor should not accept responsibility for the postnatal care of his patients who are confined in hospital and this may indeed be the pattern for the future.

The routine examinations made at the postnatal clinic are well described in all the standard textbooks but a number of points are worth stressing. Many patients at this time are dismayed at the alteration in the consistency and appearance of their breast milk. They note that it is thinner and of poorer colour and imagine that it is falling off in quality. Because of the changed appearance of the milk many women, perhaps encouraged by relatives and friends whose knowledge is as limited as their own, are inclined to change the baby from breast to bottle feeding without consulting their family doctor. At the postnatal clinic this matter may usefully be brought up for discussion and patients will be surprised to learn that their milk, in spite of its altered appearance, is still of excellent quality.

An episiotomy or perineal laceration may have broken down slightly and

at the postnatal clinic the perineum can appear deficient. The unwary doctor may mention the need for a posterior colpo-perineorrhaphy and the patient become alarmed. It is surprising how well a perineum can heal if left alone. The situation should be reviewed in six months' time and it is unlikely that there will be need for surgery. Much the same holds for cervical erosions. An erosion is commonly found at the postnatal clinic but it is much better to leave it without treatment for a further three or even six months. Most erosions will have healed spontaneously at that time. If the cervical lesion persists, and if it is associated with symptoms, then cauterization can be arranged six or nine months after delivery. Irregular bleeding is always a worrying sign and a careful examination of cervix and uterus should be made. Cancer of the cervix is occasionally found at this time and if there is any suspicion of malignancy the patient ought to be referred at once to see a gynæcologist. Routine cytological examination of the cervix at the postnatal clinic would be a most useful procedure and as the service becomes more widely available it should be introduced to the postnatal clinic.

No postnatal examination is complete without a discussion about future pregnancies. Many doctors sincerely believe that it is not for them to bring this subject up and in these circumstances most often the matter is allowed to slide and the patient receives no guidance one way or the other. The whole question of family planning is very personal and the doctor must use considerable tact and discretion. This is particularly so when the patient or her husband hold religious views against contraception. For these couples periodic abstinence, described fully by Holt (1960) in his recent book, is permissible. If the patient's doctor does not himself wish to give advice on family planning when this is sought then he can quite easily refer the patient and her husband to one of the special clinics in his area. In some cases there is a clear medical indication for avoiding or, at least, delaying a pregnancy and the doctor at the postnatal clinic should not allow the matter to go by default.

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TESTS FOR THE EARLY DIAGNOSIS OF PREGNANCY

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Although the early diagnosis of pregnancy may be desired by the patient, it is seldom that the management of the case would be altered by the delay of a few weeks. Moreover, all tests for pregnancy, whether on the patient herself or using a variety of animals, must be interpreted in conjunction with the clinical diagnosis.

THE ASCHHEIM-ZONDEK TEST

In 1928, Aschheim and Zondek introduced a test using urine injected into immature female mice.

A total of 2.5 ml. of urine is injected in divided doses, and after 100 hours the ovaries are inspected for evidence of ovulation or corpora lutea.

Some fallacies may creep into the test: a male mouse gets into the box of females, the sample of urine is too weak to contain any detectable amount of chorionic gonadotrophin, or a heavily infected urine may kill some of the test animals and the rest practise cannibalism. Despite these fallacies, and discarding unsuitable urine samples, a high degree of accuracy can be obtained, but five or six animals are sacrificed for each test.

THE HOGBEN TEST

Other biological tests using the rabbit (Friedman and Lapham, 1931), the rat (Salmon and his colleagues, 1942) and the male toad (Galli-Mainini, 1948) have been described, but the female toad, *Xenopus lævis*, is the animal most commonly used, and has the advantage that with care the toad can be used repeatedly up to 18 times in a year. The test on *Xenopus lævis* is named after Professor Hogben who was the first to show that this toad would respond to injected gonadotrophin by ovulation and oviposition.

Hobson (1952) gave details of the care of these toads: the maintenance of their tanks, feeding, the care of sick animals, and the necessary priming with chorionic gonadotrophin. The active principle is extracted from the acidified specimen on to kaolin and subsequently released by neutralization with alkali. The toad will respond to specimens of urine containing approximately 3000 international units or more of chorionic gonadotrophin per litre. Concentrations of this order are reached by the 24th to 30th day after conception, so that a negative test within the first fourteen days after a missed period would not exclude pregnancy. A peak in the excretion of chorionic gonadotrophin is reached about 70 days after the last period, and many of the false-negative results occur after this time when there is commonly a fall in chorionic gonadotrophin excretion to less than 3000 i.u. in a litre.

The positive test does not depend upon the presence of a fœtus, but on chorionic tissue producing detectable amounts of chorionic gonadotrophin. Apart from these periods of gestation when insufficient chorionic gonado-

trophin may be excreted to produce a positive test, perhaps the commonest error is the very weak urine produced after several cups of tea when the early morning specimen has been thrown away. It is quicker to discard this specimen and obtain another concentrated one, and should the urine be some days old and infected after several days in the post it is foolish to hazard it on the toad.

Observing these essentials, the treated specimen injected into the dorsal lymph sac of the toad will produce oviposition within eighteen to twenty-four hours, and if the toad is placed on a perforated grid she will not eat her eggs. If the test is negative a second animal is injected. This test is slightly more accurate than the Aschheim-Zondek test, and Hobson (1959) has recorded 250,000 Hogben tests with an accuracy of 99.3 per cent. No false-positive results were given, but there were a few false-negative results in cases in which the physical signs suggested pregnancy.

In cases of hydatidiform mole Hamburger (1944) found that urinary levels for chorionic gonadotrophin ranged from 6000 to 20,000,000 international units per litre, but negative results do not preclude the presence of a hydatidiform mole or of a chorionepithelioma. Hormone analysis cannot be used to differentiate between normal and abnormal pregnancy or pregnancy and malignancy, though abnormally high chorionic gonadotrophin titres after the 16th week of pregnancy should be viewed with suspicion. The test, if positive in dilution, can only be regarded as additional information when considered in conjunction with the clinical diagnosis, as in fact should the results of all 'pregnancy tests'.

These tests require time, some expense in the use of animals, and none is completely reliable though the accuracy is high.

VAGINAL SMEARS

Examination of the vaginal cytology is a practical and simple test to carry out, though it requires specialist interpretation. Vaginal smears were described by Papanicolaou in 1933, the changes being dependent upon the altered hormone balance after fertilization of the ovum. Bonime (1949) found that the peak of the function of the menstrual corpus luteum is usually passed by the tenth day after ovulation, and as the function of the corpus luteum begins to wane, the shed epithelial cells become twisted and folded and form clumps with increasing numbers of leucocytes and bacteria. Should conception occur, progestational function continues and the vaginal cells retain their freshness with a clarity of outline and well-preserved nuclei, and the clumping of cells is less marked. Although with skilled interpretation the diagnosis of pregnancy may be suggested, infection, a persisting corpus luteum and œstrogen-progesterone imbalance may upset the picture.

In 1946, Papanicolaou drew attention to the fact that cervical mucus when spread on a slide and left to dry showed a fern pattern of crystals. These crystals were found to be composed of salt (Macdonald and Sharman,

1959), and although present during the follicular phase of the menstrual cycle they are absent in the luteal phase and in pregnancy. Thus in metropathia hæmorrhagica or stress amenorrhœa, a single slide showing definite salt crystals gives a categorical diagnosis. If no crystals are seen the patient may be pregnant and the test is repeated after injection of 10 mg. of œstradiol. This has no effect should the patient be pregnant, but produces crystals in the absence of pregnancy. Although the test is quick, it must be combined with the clinical findings and there is the need to expose the cervix twice.

HORMONE INJECTIONS

As it is usually amenorrhœa that brings the patient to seek advice, methods were sought which would produce uterine bleeding only if the patient were not pregnant and would not harm the pregnancy. It is possible, however, that at least in susceptible cases, the hormone balance may be upset and bleeding occur despite a pregnancy. The injection of ***neostigmine*** was popular for a time, and later ***physostigmine*** and ***pyridostigmine*** were substituted.

Jaffé (1960), in a series of 100 consecutive cases of amenorrhœa, gave 60 mg. pyridostigmine thrice daily for three consecutive days at a cost of 3*s*. The test proved to be 100 per cent. accurate when bleeding similar to normal menstruation occurred indicating the absence of a pregnancy, but only 82 per cent. accurate in the cases with no bleeding, two patients being found later to be at the menopause. There was no evidence that a pregnancy had been interrupted in those patients who did bleed, but the endometrium was not examined. In the majority of cases the bleeding occurred within two days, and in only five was it delayed to five to seven days after the tablets.

In 1942, Zondek reported a withdrawal hæmorrhage in cases of primary and secondary amenorrhœa treated with progesterone or œstrogen or both.

Eleven years later, Matthew and Hobson (1953) applied this test to the diagnosis of pregnancy in 104 patients with secondary amenorrhœa, checking their results with a Hogben test in each case. Progesterone, 12.5 mg., and œstradiol monobenzoate, 1 ml. in oil, were given by injection on two consecutive days. The abortion rate in this series was 9.3 per cent., which they thought was not high as many in the series had been attending for infertility. In 77 patients the diagnosis of pregnancy was ultimately established, the injection test was negative and the Hogben test positive. In a further 14 patients who were not pregnant the hormone test proved accurate, bleeding occurring within one to nine days and the Hogben tests were negative. Only in two patients with tubal pregnancies and two with irregular menstruation were the results at variance with the final diagnosis. It was in a group of nine patients in whom the failure to produce withdrawal bleeding, thus indicating pregnancy, that the test proved of most value. In all these cases the Hogben test was initially negative, but later became positive in seven out of eight. These patients showed a high incidence of abortion, only three of the group reaching term, the negative or weak Hogben test indicating the likelihood of abortion.

It is possible, however, to speculate as to whether the administration of hormones may not be the final factor in the abortion, but Matthew and Hobson concluded that the test was safe and accurate and would indicate pregnancy within the first 14 days after a missed period.

Later, Matthew (1956) reported the results of oral instead of injected

hormones in 94 women with amenorrhœa of less than 112 days' duration.

Ethisterone, 50 mg., and ethinylœstradiol, 0.25 mg., were given orally on two consecutive days. In 62 patients there was no subsequent bleeding and all these proved later to be pregnant. Although the bleeding occurred within a week of the test in 78 per cent., it was delayed up to the 14th day in some of the 32 patients in whom pregnancy was excluded by subsequent examination.

This test proved reliable, simple and economical and in Matthew's series there were no known abortions.

Higgins and Sadler (1960), using norethisterone acetate and ethinylœstradiol, also found a high degree of accuracy, bleeding resembling normal menstruation occurring in 13 patients who were found not to be pregnant. Three patients out of 34 who proved to be pregnant had some bleeding, the first two only a scanty loss, but the third aborted nine days after the test.

Hobson (1959), commenting on this possibility, thought that the most important objection to a pregnancy test involving the injection of steroid material when other adequate tests were available, was that it is impossible to be certain that the resulting hormone imbalance, however small, may not in itself cause an abortion in susceptible women. Moreover, this test cannot be applied in the case in which the aid of a pregnancy diagnosis test is most often sought: when there is irregular bleeding and the physical signs are not yet typical. A careful history and physical examination will usually disclose the diagnosis, and should it prove as yet too early to be confident, a few weeks' delay and re-examination will prove the best test of all.

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INDICATIONS FOR THE USE OF X-RAYS IN OBSTETRICS

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Any discussion on the use of x-rays, whether it be in obstetrics or any other branch of medicine, calls for a consideration of at least three aspects of the subject: the value of such information in the proper management of the case, whether or not it can be gained from clinical methods, and the radiation hazard—its likelihood and justification. This last aspect will be considered first.

THE RADIATION HAZARD

In obstetrics there are two subjects to consider: the patient herself and her fœtus. The earlier in life the developing embryo is subjected to radiation, the more susceptible are the differentiating cells to damage and it is for this reason that the use of abdomino-pelvic x-rays in early pregnancy should be kept to the absolute minimum consistent with safe management. For the same reason it is advisable that, if possible, no woman's pelvic organs should be exposed to x-rays in the post-ovulatory phase of her menstrual cycle in case a pregnancy has already begun.

It would not be out of place to mention some of the important findings contained in the recent second report of the Ministry of Health committee under the chairmanship of Lord Adrian on 'Radiological Hazards to Patients'. This report covers the genetic effects of ionizing radiations.

The annual genetic dose from medical radiology has been found to be 19.3 milli-rœntgens (mr.) per person. This finding is very reassuring because the amount of radiation calculated to begin producing genetic effects is something in excess of 50 rœntgens in thirty years, or an average of 1⅔ rœntgens a year. Even so, the report states that the annual genetic dose could be reduced to 6 mr. per person by strict attention to the proper indications for the use of x-rays, and to improvement in technical details. The level of dosage to the gonads is thus well within the safety margin and 'requires no major restriction in radiological practice'.

This is not to say that prolonged or repeated unnecessary exposure of the gonads of the patient and her fœtus is ever without danger in the particular case.

CLINICAL JUSTIFICATION

The answer to the question as to whether or not the information being sought by x-rays can equally well be gained from clinical methods, is not as simple as might at first appear. It will vary from patient to patient and with the clinical experience of the obstetrician concerned. To take a simple example, the problem may be merely one of finding out what is presenting. In a fat patient an x-ray may be called for by even the most experienced obstetrician, whereas with normal proportions there might be no such problem even to the least experienced. With regard to the clinical worth of the

particular information being sought, x-rays can be of the utmost value. To take again the simple problem of fœtal presentation: if this is normal and there is no other adverse feature, the patient could at once be booked for home delivery; in other circumstances hospital care would obviously be chosen. There are many other instances of the importance of radiology in reducing the risks in obstetrics.

CONFIRMATION OF PREGNANCY

Very occasionally there will arise a need to x-ray a patient in early pregnancy. Normally the fœtal skeleton becomes visible on an x-ray film at about 16 weeks; in some a little earlier and in others—the more obese—some weeks later. It may happen that the particular problem to be decided is whether or not the patient has a normal progressive pregnancy of some 16 weeks, or whether, in fact, there is a hydatidiform mole. The pregnancy test may be a good deal more strongly positive than that usually found, yet this is not an uncommon finding in a normal pregnancy at this stage especially when it is multiple. If there is a mole it is obviously important to know as soon as possible so that the uterus can be emptied without delay. An x-ray *can* help by showing a fœtus of about the correct matu ty or there may be no fœtus seen at all—a finding that must be considered with discretion. Seeing a fœtal outline on the film does not, of course, exclude hydatidiform degeneration of part of the placenta or the chorionic tissue in a coexisting twin but such findings are decidedly uncommon. If no fœtal outline is seen it could mean that the patient is obese or that the film is of poor quality or that the pregnancy, though otherwise normal, is not as advanced as at first presumed. The x-ray findings here, as in so many clinical problems, must be placed alongside the other clinical details before action is decided on. To take an x-ray merely to confirm the diagnosis of pregnancy can seldom be justifiable because the clinical signs or a pregnancy test should by this time be diagnostic.

In discussing the use of x-rays in the diagnosis of pregnancy, advanced ectopic gestation may be under consideration. Useful information probably would not be expected before mid-pregnancy but thereafter it might be possible to visualize the fœtus separately from the outline of the uterus on a good film. Certainly when the diagnosis has been made with virtual certainty, hysterography could be used to confirm it before proceeding to laparotomy.

RADIOLOGICAL EXAMINATION OF THE CHEST IN PREGNANCY

In many clinics an x-ray of the chest of every patient is done routinely in early pregnancy. The reason, of course, is that unsuspected active pulmonary tuberculosis will be found once in about 500 patients. The patient can then not only receive the proper management from early pregnancy

with tremendous benefit to herself and ultimately to her baby, but she will also be segregated and in this way the chances of infecting other patients and staff will be reduced. In order to minimize the genetic effects in both mother and fœtus the Adrian Committee has advised that mass miniature radiography of the chest should never be used in pregnancy, but that full-sized films should be used instead, and that, whenever possible, the examination should be made before the 24th week of pregnancy.

SUSPECTED MULTIPLE PREGNANCY

It is probably true to say that rarely is multiple pregnancy diagnosed without the use of x-rays. The justification for this is debatable, but the fact remains that in certain cases even with increasing experience it is impossible to be sure whether or not there is more than one fœtus present. The reason for this is that the suspicion arises (and the diagnosis is made) most commonly between the 28th and 30th weeks, when the relatively small size of the fœtus and the increased quantity of liquor may combine to make palpation inaccurate. The hearing of two fœtal hearts is notoriously difficult to prove and electrographic techniques are neither easily available nor sufficiently reliable to justify their common employment. Another intriguing technique which is as yet in the experimental stage, but may well find a place in diagnostic procedure, is that of producing a picture by pulsed ultra-sound waves.

The reasons for wanting to confirm the presence of more than one fœtus are that in the first place it is now common practice to admit patients with twins for rest from about the 30th week of pregnancy until the 36th week, in order to reduce the chances of premature labour. In a unit with which I am closely concerned, this policy reduced the combined fœtal mortality rate from 11 per cent. to 5 per cent. Secondly, the alternative diagnosis would be hydramnios with a possible fœtal skeletal abnormality and, although positive action in these circumstances is seldom called for at this stage, the information given by a radiograph might well have an important bearing on the subsequent management of the case. Additional reasons for using x-rays are to be in a better position to detect the occasional skeletally conjoined twins and finally—but not the least in importance—to satisfy the natural curiosity of the patient.

SUSPECTED FŒTAL ABNORMALITY

Suspicion of this complication usually arises from noting the presence of rapidly increasing hydramnios, when anencephaly would be feared. This problem usually arises at some time after the 30th week. If the apparently normal head can be made out by palpation there is no justification for using x-rays, but this is not commonly the case. As already mentioned, multiple pregnancy often needs to be excluded too. Other fœtal abnormalities which may be associated with hydramnios may be present, one of which—*tracheo-*

œsophageal fistula—would not show up on an x-ray film and the other—*spina bifida*—may be seen if there is a significant bony defect.

Hydrocephalus is usually suspected in late pregnancy and may present as cephalo-pelvic disproportion in the later weeks. In a well-developed case the large tense head whose thin vault bones 'spring' readily on pressure leaves little room for doubt, but lesser degrees might well call for an x-ray. In connexion with the diagnosis of hydrocephalus, a point to be borne in mind is the apparent enlargement of the head of the fœtus presenting as a breech when the film is taken in the antero-posterior position. Before a decision is made a confirmatory postero-anterior film would be required. Formerly it was common practice always to take an x-ray of the fœtus to exclude abnormality before Cæsarean section. This is no longer the routine practice but, when an abnormality is suspected, obviously an x-ray would be called for unless there is no alternative to Cæsarean section.

SUSPECTED HYDROPS FŒTALIS

When severe, the effects of hæmolytic disease of the newborn may often be demonstrated by a straight x-ray of the abdomen, after fœtal ascites and œdema of the subcutaneous tissues, especially the scalp, have had time to develop. The condition would be suspected clinically in a multiparous Rh-negative woman with a high antibody titre in the last trimester who had probably been delivered of a badly affected baby at her last confinement. The uterus is usually larger than would be expected for the estimated maturity and its contents have a doughy, flabby feeling. If the condition has already developed it is too late to do anything to improve the outlook; on the other hand, if there is no radiological evidence of hydrops fœtalis, there may still be time to deliver a viable fœtus. Knowing that full reliance cannot always be placed upon the level of antibody titre alone, in certain circumstances confirmation that progressive hæmolysis is taking place can be gained from aspirating the amniotic fluid via the anterior abdominal wall and examining it for the bile pigment content. The typical changes seen on the x-ray film when hydrops fœtalis is present are the typical Buddha-like attitude the fœtus assumes due to the effects of ascites and œdema, and the 'halo' produced by œdema of the scalp.

SUSPECTED INTRA-UTERINE DEATH OF THE FŒTUS

Usually this problem arises when either the patient herself reports the cessation of fœtal movements, and perhaps failure to enlarge, or when the fœtal heart can no longer be heard. The changes brought about by autolysis, giving rise to collapse of the skull with overriding, to the rolled-up attitude of the fœtus of relatively fixed position (if successive films have been taken) and to the development of gas in the fœtal heart and great vessels, make their appearance at varying intervals after the event. On average the signs take about a week to develop although, when the gas does form, it may

be seen as early as three days after intra-uterine death. There is usually no special need to diagnose fœtal death without delay unless the patient herself suspects it and wishes to know for certain. Successive clinical observations will usually give evidence reliable enough to allow a firm diagnosis to be made without the aid of x-rays. The radiological signs of intra-uterine death need to be interpreted with caution for false positives are seen from time to time, the one exception being Robert's intravascular gas sign. If this is undeniably present, then without doubt the fœtus is dead.

SUSPECTED MALPRESENTATION

Probably the commonest reason for using x-rays to determine the presentation is when a breech presentation is suspected; yet this is the easiest malpresentation to diagnose except perhaps for transverse lie. It can be difficult, of course, when the patient is obese and cannot relax, and when the placenta lies on the anterior uterine wall. Nevertheless, a request for an x-ray to determine the presentation should never be made by anyone except the most experienced clinician available, because it often uses up valuable radiation dosage needlessly, when it may well be required later for some more important procedure like pelvimetry or placentography. The whole question as to who should order x-rays at all in pregnancy needs careful consideration for this very reason; the guidance already suggested on this point has proved to be practical.

A face presentation is almost always diagnosed by x-rays in late pregnancy because the unengaged head feels an odd shape or seems bigger than normal. With a brow or a persistent breech pelvimetry is often called for to determine the ultimate method of delivery, but would not be done invariably if the patient proved easy to assess by vaginal examination.

MATURITY AND POSTMATURITY

Much has been written on the subject of deciding fœtal maturity by the use of x-rays, but there is still much division of opinion as to the value of the method, not only between radiologists and obstetricians but also between radiologists themselves, particularly with regard to the method offering the more precise information. Some are guided by particular skull measurements and others by the presence or absence of certain ossification centres. Unfortunately neither method is really accurate and can easily be as much as four weeks outside the correct figure either way.

The problem of deciding the maturity of a fœtus usually arises when induction of premature labour is being considered for complications such as persistent mild pre-eclamptic toxæmia and erythroblastosis fœtalis. The point of practical importance here is that a fœtus stands a much better chance of surviving if delivered after the 36th week rather than before. When the maturity of the pregnancy is unknown the problem of what to do for the best is made much more difficult: whether to induce and perhaps lose the infant from gross prematurity, or to delay and have an equally

bad result from intra-uterine death or kernicterus. All that can be hoped for from the radiological estimate of maturity is an approximate figure which must be studied by the obstetrician together with such clinical details as are available.

What has been said on estimating maturity by radiological methods is equally true for postmaturity. Here the problem is made a little easier on the one hand and more difficult on the other: easier in that it is simple to say that the fœtus looks fully mature or even postmature from the appearance of its bones, fontanelles, and ossification centres, yet more difficult in that it is impossible to say by how much the fœtus is postmature—a week, two weeks, three, or even more; and yet the strict management of postmaturity demands a degree of accuracy which unfortunately is not offered by radiology.

It would therefore appear that it is rarely worth while subjecting a patient and her fœtus to an abdominal x-ray in order to try to estimate the maturity or postmaturity. In practice it is seldom used, for clinical judgment is fully as accurate except possibly when there is hydramnios or gross obesity.

INDICATIONS FOR PELVIMETRY AND CEPHALOMETRY

Of the various radiological procedures used in pregnancy, pelvimetry carries by far the highest radiation dose to both mother and fœtus. Yet knowledge of this fact should not prevent its use when there are proper indications.

The chief indication for pelvimetry is when there is a persistent breech presentation in a primigravida and clinical examination fails to give satisfactory evidence that the pelvis is normal. It is done in this case chiefly because the head, being in the fundus, cannot be fitted into the brim as it can in a head presentation. Cephalometry is seldom called for now in breech presentation because, if the pelvis is normal, the normal aftercoming head will find no difficulty so long as it remains flexed. If the pelvis is not normal, breech delivery is best avoided. Only if hydrocephalus is suspected in a breech presentation might cephalometry be asked for and then a postero-anterior film must be taken. The typical appearance would probably make measurement of the head unnecessary.

Another indication for pelvimetry in pregnancy is when pelvic contraction, especially with asymmetry, is suspected. In most cases the problem arises in a primigravida at about the 36th week when the head cannot be made to engage and there appears to be some degree of overlap. This might have resulted from rickets, from a generally small stature, or from inequality of pelvic growth due to shortening of a leg. In some cases the particular build of the patient—e.g. the short thick-necked obese patient—might arouse suspicion of the presence of an android pelvis; or perhaps there is a history of a fractured pelvis. In a multipara there may be a history

of difficult labour or stillbirth suggesting an abnormal pelvis, possibly even the development of spondylolisthesis after a series of normal labours.

Pelvimetry is particularly valuable in showing the size and shape of the lower pelvis and it has this great advantage over digital examination even under anæsthesia.

A standing lateral x-ray of the head-pelvis relationship in labour can be of the greatest value. It will not only show how much of the head has gone through the brim but will also show whether or not there is favourable asynclitism—a point of great importance in prognosis. Because of the comparatively heavy radiation dose entailed in pelvimetry the Adrian Committee advises that the supero-inferior view of the inlet which carries the heaviest dose of all should be omitted whenever possible. Needless to say, in ordinary circumstances pelvimetry should only be ordered by an obstetrician.

INDICATIONS FOR PLACENTOGRAPHY

By this is meant soft-tissue placentography, which is a simple technique and, when carried out with attention to the few essential details, carries a high degree of accuracy. It is also a safety one, in that it requires only a comparatively low radiation dosage, especially when the 'one film only' technique is used, which is usually all that is needed.

The chief indication for soft-tissue placentography is in diagnosing suspected placenta prævia and this may be either before the patient has bled or afterwards. For obvious reasons it is better to discover placenta prævia before bleeding has started. Placentography is the only safe way of doing this in most cases and, when the cervix is long and undilated, may even be the only way. There is no other method by which major placenta prævia can be diagnosed and treated without bleeding ever having taken place. Whenever the presenting part is elevated above, and will not approach, the brim, and no other cause, such as a full rectum or pelvic tumour, is found, placenta prævia should be suspected, even though there has been no bleeding. These physical signs are most common around the 36th week or after, although when a major degree of placenta prævia is present an observant clinician may find an elevated presenting part as early as the 30th week. Other physical signs help: the forwardly displaced head in posterior placenta prævia and the somewhat obscured head when the placenta is on the anterior wall of the lower segment. Slowing of the fœtal heart when the head is pressed down is not diagnostic of placenta prævia for it will happen whenever the head is subjected to pressure, even when it is in the fundus.

If there are so many signs by which placenta prævia may justifiably be suspected, why is there any need for placentography? The reason is that abdominal palpation is notoriously unreliable for reasons which may be found in obesity, hydramnios and occipito-posterior position.

In a series of my own in which the indication for placentography was 'antepartum hæmorrhage and high head', just as many cases were proved ultimately not to have

placenta prævia as those who had—and this with *bleeding* as an additional suspicious sign! As proof that the method is of practical value 30 out of 90 cases of placenta prævia were diagnosed before bleeding had taken place, and in 15 of these, nine of which were of major degree, there was no bleeding at any time.

The important point here is that the obstetrician must be ever watchful for the presenting part which is elevated above the brim (as distinct from that merely 'unengaged'), no matter what the stage of pregnancy. When no other cause can be found placenta prævia is likely to be present and soft-tissue placentography will almost always provide the correct diagnosis.

Another obvious indication for placentography is to be found in the expectant management of antepartum hæmorrhage. If the patient has been admitted much before the 36th week there will be a long period of waiting in hospital if ultimate diagnosis is to be made by examination under anæsthesia. In the patient in whom placenta prævia is not found, not only will she have wasted her time in hospital because she had once bled a little but there will have been waste of a valuable antenatal bed that might have been used for resting a pre-eclamptic toxæmia patient. If, of course, placenta prævia is ultimately found, the patient is usually pleased that she did rest, though perhaps impatiently, for so long; but how much more patiently would rest have been taken if there had been an assurance soon after admission that she had placenta prævia? Placentography can eliminate both the uncertainty and needless waste of beds and time.

CONCLUSION

These, then, are the reasons why x-rays are used in obstetrics today. Radiography has in the past played a valuable part in making possible the great improvement that has taken place in the figures for maternal and neonatal mortality and morbidity in recent years. It would be a great misfortune if fear of radiation genetic hazards, shown conclusively by the Adrian Committee's report to have been greatly exaggerated when ordinary care is used, were allowed to reduce radiological practice in obstetrics to relative impotence.

The subject is one of comparative risks which only the obstetrician can evaluate and his clinical sense and responsibility must not be clouded by unreasonable antipathy or misinformation regarding radiology in obstetrics.

THE PROPHYLAXIS OF ACUTE POLIOMYELITIS

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THERE are three types of poliovirus. Type 1 includes the Mahoney strain; the Brunhilde strain modified by Enders and known as the Brunenders strain; the SM and Frederick strains. Type 2 includes the MEF-1, the YSK, MV and TN strains. Type 3 includes the Saukett and Leon strains.

POLIOVIRUS TYPES USED IN VACCINES

The Mahoney strain is that used in the Salk killed vaccine. It is neurotropic, highly virulent for monkeys, easily grown in tissue cultures, and exhibits fairly good antigenic qualities. Of the paralytic cases which occurred in the United States following the use of a large batch of vaccine that still contained live virus, almost all were due to the Mahoney strain virus, although types 2 and 3 in the faulty vaccine were also alive. Sabin states that it is noteworthy that most of the naturally occurring type 2 and 3 viruses are as highly neurotropic as type 1, and yet almost all epidemics, and about 84 per cent. of paralytic cases, are caused by type 1 virus. The type 1 Brunenders strain incorporated in the British vaccine is much less virulent than the Mahoney strain used in American vaccines. The type 2 viruses are responsible for about 7 per cent. of cases of poliomyelitis. MEF-1 is used in the Salk vaccine, whilst British manufacturers use the MEF-1 or the YSK. Both are of low virulence. The type 3 viruses include the Saukett and Leon strains and are responsible for about 9 per cent. of cases. The Saukett is employed in the Salk and British vaccines.

FORMALIZED (KILLED) POLIOMYELITIS VIRUS VACCINES

In the large-scale field trails conducted in the United States in 1954 (Francis *et al.*, 1955) the Salk vaccine was found to be effective to the extent of 60 to 70 per cent. against the three types of paralytic poliomyelitis. It was 90 per cent. effective against types 2 and 3, but was less effective against type 1. The children inoculated were between 6 and 9 years of age. Field trials with a similar vaccine were carried out in England in 1956 (M.R.C., 1957b). The Brunenders strain was substituted for the type 1 Mahoney strain, because it was less virulent though of comparable antigenicity, and younger children were included. In all, 150,000 children aged $1\frac{1}{2}$ to $9\frac{1}{2}$ years were vaccinated and contrasted with 1,500,000 unvaccinated. The results indicated that 80 per cent. of children between $1\frac{1}{2}$ and $5\frac{1}{2}$ years, and 84 per cent. of those between $5\frac{1}{2}$ and $9\frac{1}{2}$ years, were apparently protected by the vaccine. Again, type 1 was found to be a comparatively poor antigen.

DURATION OF IMMUNITY WITH KILLED VIRUS VACCINE

Salk made his trivalent vaccine from strains responsible for epidemics in the United States. This vaccine stimulates antibody formation to the three types of poliovirus.

Specific antibody to each type develops simultaneously in 80 per cent. within seven to ten days after the first intramuscular injection of 1 ml. Antibody in amounts likely to be of protective value is obtained about four weeks after the second injection (given two to four weeks after the first) in practically all cases.

Circulating antibody begins to decline after the second injection and reaches a low level within twelve months.

A report to the Medical Research Council (1957a) states that in 100 children with no detectable antibodies before the two primary injections, the decline in antibody levels was greatest in types 1 and 3, and after eight to twelve months the titres were very low. In most of the children a substantial antibody response was obtained to all 3 types after the third so-called 'booster' injection.

It was later demonstrated by Russell (1958) that where antibody pre-existed as the result of a natural infection, vaccination with the corresponding type induced much higher levels of antibody: the equivalent of a booster response.

In a further report to the Medical Research Council (1958) it was shown that the response to primary vaccination in older subjects between 13 and 50 years was similar to that of children between 1 and 9 for types 2 and 3, but was not so good for type 1.

The antibody level tends to fall more quickly during the first six months than subsequently. One year after the two primary doses it was shown to decline to about a quarter of the immediate post-primary value (M.R.C., 1959), so that it is clear that the third or booster injection should not be unduly delayed. Salk (1953), however, showed that too short an interval between the primary and booster injections limits the booster effect and, for that reason, he advocated a period of seven months between the second and third injections.

The total duration of effective immunity after three injections is as yet undetermined.

Brown and his colleagues (1958) found that the mean titres two years after the booster dose showed a fourfold decrease in antibody in a significant number of children: in effect, reducing it to what it was immediately following the primary response. On the other hand, measurable antibody titres have been found in children two years after the third injection (Logan *et al.*, 1960), and Salk (1960) has shown that antibody persists for at least six years after the booster dose in children if the primary dose of antigen is adequate.

In adolescents and adults the response to three intramuscular doses of the best vaccines made in this country appears to be satisfactory for types 2 and 3 but less so for type 1. In fact, the protection afforded for type 1 was found to be very inadequate in about one-third of the vaccinees, and it has been suggested (M.R.C., 1959) that a fourth dose will be necessary if a booster response and long-lasting immunity are to be obtained in a bigger proportion of older people; or alternatively that the potency of the type 1 component in present-day vaccines should be increased.

Statistics prepared by the U.S. Public Health Service, and quoted by Salk (1960), clearly show that in the United States in 1959 the number of cases of paralytic poliomyelitis affecting all age-groups was related to the number of immunizing doses received by each individual, so that 92 per cent. of the vaccinated population was protected after three doses and 96 per cent. after four.

Salk (1960) has shown, however, that the antigenic response and the duration of that response are essentially a function not so much of the number of doses as of the quantity or the antigenic capacity of the primary stimulus, and he anticipates that the ideal will be reached when vaccines of sufficient potency enable immunization to become a 'one-dose procedure'.

IMMUNITY IN THE NEWBORN

The great majority of new-born infants are protected against poliomyelitis during the first few months by antibodies acquired before birth by transplacental transmission; this passive immunity is gradually lost.

According to Perkins and his associates (1958, 1959) the serum antibody level for all 3 types is approximately halved every 21 days, so that it is very low by the time the infant is 16 weeks old. It was also shown that the presence of maternal antibody prevents a satisfactory response to vaccination with the usual two primary doses in early infancy, even with an increase in the amount of the antigen and the number of injections.

The results were better by the age of 16 weeks, but not entirely satisfactory, especially with type 1. These workers therefore recommend that immunization should be delayed till after 6 months of age and that three, instead of two, primary doses should be given at this time.

LIVE VIRUS VACCINES

Although naturally occurring poliovirus strains differ greatly in virulence, invasiveness, and capacity to damage the central nervous system, their antigenic potential is more evenly distributed, which goes to explain why most people acquire protection at one time or another as the result of inapparent (i.e. subclinical) intestinal infection. This conception was the basis for attempts to provide an oral vaccine capable of causing asymptomatic alimentary infection but incapable of invading the nervous system and causing paralysis.

The main difficulty was to attenuate the virus sufficiently to make it safe without destroying its antigenic power and faculty of reproduction. In addition, the product had to be stable, free from harmful side-effects and able to provide prolonged protection. Koprowski and Sabin, independently, with their co-workers, were ultimately successful in providing vaccines that appeared to meet these exacting criteria. The methods they evolved included repeated passage of selected virus particles from suitable strains through tissue cultures, measures of purification and refinement and tests for the exclusion of pathogenic bacteria and alien viruses, and particularly for increase in neurotropism. In 1956, Koprowski and his colleagues (1956b) reported the development of type-specific antibodies, without ill effects, in a considerable number of children after feeding a vaccine containing types 1

and 2 viruses. Since then, increasingly large numbers of people in many parts of the world have been immunized against all three types by the oral route.

When poliovirus is swallowed by non-immunes or by those already vaccinated by injection, it colonizes in the alimentary tract and can be recovered in the fæces within a few days, and subsequently for a variable number of weeks. The excreted virus can infect non-immune contacts, though perhaps not so readily as do naturally occurring, so-called 'wild' viruses. The vaccine stimulates the formation of type-specific neutralizing antibodies which appear in the blood in from seven to twelve days.

Attenuated vaccine acts like a natural infection in that it inhibits subsequent infection of the alimentary tract with poliovirus. In this it has a notable advantage over inactivated vaccine which does not prevent re-infection, with the result that Salk-type vaccinees may become carriers of virulent strains and a danger to contacts at risk.

INCREASE IN NEUROVIRULENCE OF EXCRETED VIRUS

The American workers soon discovered that some poliovirus strains fed to chimpanzees or human beings gained in neurovirulence after multiplication in the alimentary tract. Refinements in technique, however, enabled them to select and propagate strains that did not seem to have this fundamental drawback, even after many passages through the human intestine, and they incorporated these strains in their vaccines. Dane and Dick and their colleagues (1957), using the same types as Koprowski, confirmed that the corresponding antibody developed in a proportion of the infants, children and adults, and was associated with virus excretion over a period of one to seven weeks, and with spread within a normal family, but they abandoned the use of the type 2 (TN) vaccine because of an increase in paralytogenic properties after passing through the human intestine. Sabin (1959) found it difficult to accept the criteria which led Dane and Dick to stress the increase in neurotropism of the oral viruses they employed; and, although millions of people have been fed attenuated vaccines, there is no positive evidence to date that the virus excreted by them has caused paralytic poliomyelitis in non-immune contacts.

DURATION OF IMMUNITY WITH LIVE VIRUS VACCINE

The degree and duration of the immunity conferred by oral vaccines are as yet undetermined. Cox and his colleagues (1959) found antibodies in adults at least nine months after oral vaccination. Sabin (1960) found them two years after feeding all three types, and Koprowski (1960) states that antibody resulting from feeding type 2 virus to children in 1950 was present eight or nine years later—'the longest period so far tested'. Koprowski sees no reason why immunity after oral vaccination should not last for life.

Dane and Dick and their colleagues (1958) did not report so favourably. One year after they gave Koprowski's vaccine to 60 children they confirmed

that 23 per cent. of them had failed to develop antibody, and found that a number of them showed a marked decline in their neutralizing antibody level.

Sabin holds that the degree of the antibody response depends upon a number of variables relating to the individual and to the type and strain of virus fed. Some patients with poliomyelitis respond with high titres and some with low, and in most the titre drops from four- to twenty-fold during the course of a year or two following infection. After a number of years circulating antibody falls to very low levels and is refractory to a booster response in many who nevertheless remain clinically immune to the disease. He (Sabin, 1959) contends that the level of the neutralizing antibody is not a measure of total immunity, and that the 'resistance of the alimentary tract to infection with poliovirus is not dependent on the persistence of antibody . . . but is based on specific cellular rather than on humoral factors'.

PRODUCTION OF HETEROPHILE ANTIBODY

Specific neutralizing antibody is produced as the result of infection or immunization with a given virus type. It is probable, however, that at least type 2 poliovirus possesses antigenic components common to types 1 and 3 and stimulates a small amount of antibody which is able to afford a slight degree of protection to these types (Salk, 1955; Hammon and Ludwig, 1957). In such circumstances subsequent infection or immunization with types 1 and 3 appears to cause a higher production of antibody than might be expected—in effect a booster response.

INTERFERENCE PHENOMENON

Sabin (1956) showed that the feeding of attenuated strains of the three types simultaneously in chimpanzees resulted in complete suppression of type 3 virus. Others, as well as Sabin, have produced evidence that living attenuated virus of one type can prevent implantation in the intestine of another, whether demonstrable circulating antibody is produced or not.

This phenomenon of 'interference' led Hale and his colleagues (1959) to administer a type 2 strain attenuated vaccine to about 200,000 children between the ages of 3 months and 10 years during the epidemic of type 1 poliomyelitis in Singapore in 1958, in the hope that the dissemination of large quantities of attenuated type 2 virus throughout the community would interfere with the transmission of the prevalent epidemic strain. In the event, only six of the 198,965 children given the type 2 vaccine developed paralysis with type 1. By contrast there were 179 paralytic type 1 cases in approximately 300,000 non-vaccinated children of the same age-group.

Hale's successful use of 'interference' to prevent the spread of a virulent strain is of considerable interest though unlikely to be of much practical value in the future. It should be noted that 'interference' is not limited to polioviruses but extends to unrelated enteroviruses such as the Coxsackie and ECHO viruses which by their presence may lead to the failure of oral vaccination by preventing colonization of poliovirus in the alimentary tract, particularly in summertime when they are most prevalent.

The interference phenomenon whereby the feeding of one type prevented

or minimized the immunizing effect of another fed simultaneously led Sabin (1958) to the conclusion that 'immunization against all three types by a single administration of them is not feasible', and he advised that they should be fed separately at intervals of three weeks in the order: type 1, 3 and 2. More recently, Cox and his associates (1959) reached the opposite conclusion from their experiments and considered simultaneous trivalent vaccination both feasible and practical. Sabin's technique of feeding each type separately, however, has been used in the vast immunization programmes current in Russia. Two feedings of each type are advocated and in Russia this is being done by giving a trivalent form of the vaccine three to eighteen months after the primary doses.

IMMUNIZATION OF THE NEWBORN

As already stated, most new-born infants are passively protected against poliomyelitis by inherited maternal antibody. Non-immune women appear to be at greater risk during pregnancy, and the majority of infants born to those who contract the disease near term become infected *in utero* or more probably at birth, and die or are paralysed during the first three weeks of life. Poliovirus has been cultured from the meconium (Barsky and Beale, 1957) and can usually be cultured from the stools a few days later, and type-specific antibody can be detected in the blood about a week after birth. Infants born to women with acute poliomyelitis should be given an intramuscular injection of 500 mg. of gamma globulin without delay. This furnishes passive protection for three or four weeks, by which time production of active antibody in those who have been infected is high enough to ensure immunity.

Koprowski and his colleagues (1956a) found that infants less than 6 months of age can be successfully immunized with attenuated virus vaccine despite the presence of transplacentally acquired antibody. Infants under 2 months of age, however, are slightly more resistant and may need a larger dose of virus. At this age, too, it is thought that better immunity is obtained after feeding each type separately than after a feeding of a mixture of all three types. Each type must be fed at least twice and some authorities advise two feedings of trivalent vaccine. Koprowski believes that for a number of reasons the neonatal period is ideal for the oral vaccination of infants.

WHICH WILL PREVAIL?

Which will prevail—immunization with killed virus or with live virus? As has been seen, there are distinguished advocates on both sides and in time the issue will be decided in the light of the statistical and other information that will emerge from the vast immunization programmes in progress. In the United States, and particularly in Great Britain, vaccination with attenuated (live) virus is restricted because it is still on trial. Large-scale trials of live vaccine are taking place in the United States, Switzerland and West Berlin and will be studied with attention for any signs of increase in

neurovirulence in the strains of virus fed. Live vaccines are officially used in the Soviet Union, where, during the first three months of 1960 alone, 55 million people were so immunized. Live vaccines are also generally employed in Czechoslovakia, East Germany, Hungary, Poland, South America and (until recently) the Congo. As to the results, a striking reduction in the incidence of poliomyelitis is said to have occurred in Estonia and Lithuania following on mass vaccination in 1959, as well as in certain other areas in Russia (Report, 1960).

The Salk or Salk type vaccines are officially used in Britain and many other countries. Poliomyelitis vaccine is issued to local health authorities by the Ministry of Health and is now available to people of all ages. There are few contraindications to vaccination, which may be performed safely at any time of the year even when poliomyelitis is prevalent. It is recommended that two injections of 1 ml. of the vaccine be given at an interval of not less than three weeks, followed by a third dose of 1 ml. at an interval of not less than seven, or more than twelve, months after the second dose. No recommendations have as yet been made by the Ministry as to the administration of a fourth dose or of larger primary doses. Most authorities in this country consider that infants should receive the first injection at the age of 7 to 8 months and the second one month later. The booster dose of 1 ml. should be given at 15 to 18 months. As to the timing of other immunization procedures in relation to poliomyelitis immunization, one or other of the recommended schedules (Symposium, 1960) should be followed.

The recommendations of the U.S. Public Health Service (1959a) are similar to those of the Ministry of Health for people of all ages except that a fourth dose of 1 ml. of vaccine is advised: (a) when children enter school; (b) in adults a year or more after the third dose, or when local epidemics of poliomyelitis are beginning; (c) in pregnant women before the poliomyelitis season. In young infants three primary doses spaced one month apart are advised instead of two, followed by a fourth injection seven to twelve months after the third dose. The first dose is given as early as two months and before the sixth month of age. Poliomyelitis vaccine for infants and young children 'may be given as separate injections or in quadruple vaccines which combine polio vaccine with diphtheria, pertussis and tetanus vaccine'.

RESULTS

Whilst at this stage it is impossible, for many reasons, to give precise figures relating to the reduction of the morbidity and mortality in this country since vaccination began four years ago, some idea may be gained from the calculations of Geffen and Spicer (1960) that in England and Wales in 1958 poliomyelitis occurred in 4.3 per 100,000 of those vaccinated compared with 21.4 per 100,000 of the unvaccinated under 15 years of age: 35 children died from the disease, but of these only three had had the vaccine. Geffen (1960) estimates that in 1959 only 1.4 per 100,000 of those under 15 years who received two or more doses of vaccine developed paralytic poliomyelitis,

compared with 12.4 per 100,000 unvaccinated. The incidence of paralysis was inversely related to the number of doses of vaccine which had been administered.

In the United States the incidence of poliomyelitis remained high from 1948 through 1955, but by the end of 1957 it had been reduced to 1.5 cases per 100,000 population; that is, one-fifth of the 1955 figures and the lowest level since 1942 (U.S. Dept. of Health, 1959b). In 1959, however, the number of paralytic cases rose to more than double the 1957 figure. Crowded areas in all parts of the country were affected by sharp outbreaks. A careful study revealed that these were mainly due to the incomplete use of Salk vaccine in many poor class urban communities, and not to inadequacy of the vaccine employed, which was calculated to be 80 to 90 per cent. effective for three or more doses (Langmuir, 1960).

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A SUMMER SCHOOL FOR DIABETIC CHILDREN

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Annually, for the past ten years, the British Diabetic Association has arranged schools or camps for children of varying ages with diabetes mellitus. The aim of these camps is threefold. First, they give the child a good holiday; secondly, the diabetes can be observed under good conditions (i.e. constant medical attention and strict dietetic control) and full activity; and finally, the children are taught more about their illness and they are shown that, with care and foresight, they can lead a normal life.

ORGANIZATION

Last year there were five such camps, and I had the privilege of being a medical officer at one of them—ideally situated in a boys' preparatory school at Dorton, near Aylesbury, set in beautiful countryside—with its own swimming-pool, cricket pitch, tennis and squash courts.

There were 73 children, 41 boys and 32 girls, between the ages of 10 and 15. The duration of their diabetes ranged from a few months to ten years. They came from all parts of Great Britain, and belonged to every social class. Those who were poorer were given assistance by their local authorities.

The camp had two doctors, one of whom was a tutor in medicine at a teaching hospital and experienced in treating diabetes. He was also the warden of the camp. The other doctor (myself) was the assistant medical officer. There were four State Registered nurses and four hospital dietitians, all of whom had first-hand knowledge of caring and catering for diabetics. There were five clinical medical students who helped with the medical routine, and six lay people who were used to dealing with children in their capacity as youth club leaders, schoolteachers, and the like. These latter members of the staff, who were called leaders, were charged with keeping the children amused, and each leader had his own appointed job: for example, arranging indoor games, outdoor sports, the camp concerts.

The medical supplies were generously given by drug firms and the pharmacy of a general hospital. We had stocks of every kind of insulin in both 40 and 80 units/ml. strengths as well as replacement insulin syringes. There were autoclaved syringes for injecting glucose and an assortment of fluids for intravenous infusion together with sterile administering sets. In addition, there was enough equipment in our dispensary to deal with such widely differing conditions as a cut hand and an attack of diarrhœa. One of the rooms was set aside for use as the dispensary and the room next door was fitted out with a bed and used as a sick bay. The nurse on duty slept there by night so that she could keep an eye on any child who was in the

sick bay, and also so that any child who required medical attention during the night would know where to find a nurse.

THE DAILY ROUTINE

The daily routine started at 00.70 hours, when the children woke up and dressed. They then tested their urine with 'clinitest' outfits and the procedure was supervised by the medical students. The result of the test was marked on a card which the children took to the 'insulin station'. This was situated in a classroom. There they were seen by one of the doctors, who made changes in the diet or insulin dosage if necessary. The children drew up their own dose of insulin and had it checked—by the nurses on the girls' side or by the medical students on the boys' side—and proceeded to give their own injection. Those who could not do this were given instruction, and by the end of the holiday no-one needed assistance. At this stage we detected faults in injection technique: e.g. syringes which were leaking or with the wrong calibration, inadequate sterile precautions, blunt needles. These were all corrected during the course of the holiday. Urine testing was performed only once a day, but if the tests were not satisfactory they were repeated before lunch, tea and supper. This gave us a good over-all picture of the control of the diabetes and enabled us to make any adjustments necessary.

The children then had their breakfast. They led a normal active day until bedtime, which was at 21.15 hours. Those who were having two injections of insulin a day once again made their way to the 'insulin station' at 17.00 hours, and had their insulin checked in the usual way. The diet was built around five meals a day: breakfast, mid-morning break, lunch, tea and supper. No account was taken of the protein or fat content of the meal, but the children were allocated carbohydrate in 10-gramme portions divided between the meals the same as they were having at home. This system proved reliable, as few alterations in the diet had to be made, and these were of a minor degree.

THE SICK PARADE

The nature of the illnesses, such as they were, could be divided into two categories: first, those due directly to the diabetes mellitus, and secondly, those which were coincidental and might occur to any child on holiday.

The commonest deviation from normal in the first group was the 'insulin reaction' or hypoglycæmia. This was particularly common, probably, because the children were more active at the camp and because their diet was more strictly controlled than at home. Most of the children were able to recognize when they were having a 'hypo' and could then ask one of the staff for some glucose; we all carried a packet of glucose sweets in our pockets for such an eventuality. Most of these attacks were very mild and easily cut short. In the whole fortnight, only two children lapsed into hypoglycæmia deeply enough to require intravenous injection of glucose.

At the other end of the scale, there were two cases of diabetic ketosis.

The first occurred on the second day after arrival, and affected one of the boys who had previously been perfectly stable. He suddenly developed ketonuria and a

very heavy glycosuria in association with headache, nausea, abdominal pain and lethargy. He was treated with supplements of soluble insulin according to the amount of sugar in his urine during the course of the day, and the next day he was able to get up. After this episode, his diabetes was quite stable on the original dose of insulin and he proceeded to have a full and enjoyable holiday.

The second child to develop ketosis was a 'brittle' diabetic who was having a large dose of insulin as well as phenformin. One night, she had the usual symptoms, but she also vomited several times so that by the morning she was dehydrated. This necessitated the administration of Butler's No. 1 solution by intravenous infusion as well as supplementary insulin injections. She responded well, and was back to normal within forty-eight hours. Her diabetes was never well controlled throughout her holiday.

An interesting fact is that throughout the fortnight all the diabetics were maintained under control solely with reference to urine analysis. We did not have the facilities for blood sugar or serum electrolyte estimations, but there was no evidence that anyone suffered on this account.

We had three cases of intercurrent infection: an injection abscess in a thigh, an abscess in a buttock and a case of cellulitis in a forearm following an abrasion. These all produced minor upsets in the diabetes and required temporary increases in the dose of insulin, and they responded to parenteral penicillin. There was the usual crop of insect bites, strained wrists, cuts and grazes, as well as a greenstick fracture which was put in plaster at the camp.

THE DAILY PROGRAMME

The children led a very active life by day. We had such games as tennis, squash racquets, rounders, cricket and football. Those who were not inclined towards athletics went out for walks with a member of the staff or with an older child. There were two one-day excursions: to Oxford and to Whipsnade Zoo. The diabetes did not interfere with these trips as we left after breakfast and had the mid-morning snack on arrival at our destination. Lunch consisted of sandwiches prepared by the dietitians, each child having his or her correct share of carbohydrate. We arrived back at the school in time for the evening injections of insulin, followed by tea.

Entertainment was provided for the children in the evening: for example, there was a fancy dress party and a dance. Concerts were put on both by the children and the staff and on the last night a camp fire and sing-song.

All this required much energy and patience on the part of the staff, because, as well as entertainment, there were other duties. Washing-up and tidiness of the dormitories had to be supervised. We also had to ensure that the children went to bed at the correct time (always a difficult job!).

EPILOGUE

Taken over-all, this was a most enjoyable and instructive fortnight, for both children and staff. We had a practical demonstration of Lawrence's words: 'The diabetic life demands self-control from all its subjects, but it gives in return a full and active existence, with no real privations'.

I would like to express my thanks to Mr. J. Jackson, of the British Diabetic Association, and Dr. F. E. Higgins, for their help in the preparation of this article. I would also like to thank Dr. D. N. Baron, who suggested that the article be written.

GENERAL PRACTITIONERS' FORUM

THE SCOPE OF OBSTETRICS IN A GENERAL PRACTICE

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The proposal to build a new maternity unit in the area, the discussion whether it should be staffed by general practitioners or by a consultant, and the publication of the Cranbrook Report prompted an investigation into the last 250 patients who presented in a general practitioner's surgery as pregnant. It is realized that this survey cannot have any great bearing on the national obstetric services, in view of the small number involved and the variation of local conditions and facilities. It is believed, however, that it represents the scope for midwifery in general practice, and as such may be of interest to those who have a limited view of obstetrics as a whole. This survey may also have an advantage over that of the College of General Practitioners (S.W. Faculty, 1957), in that here a consistent policy has been pursued by one practitioner only. The material comes from a mixed practice of new town inhabitants, the old town residents, and a handful from local villages. The patients come chiefly from the population of the new town and were collected over four years as the area developed.

THE FACILITIES

The main consultant hospital is seven miles away. The rapid development of the area has put a great strain on its beds and it can only accept abnormal cases and primiparæ (in the last eighteen months it has had to refuse a proportion of these). Recently a policy of early discharge has been adopted in certain cases. Patients booked for confinement at the hospital come by arrangement to the general practitioner's antenatal clinic, apart from a booking visit and a visit at the 36th week to the hospital. This is an admirable arrangement and works well—at least from the general practitioner's point of view, for he undertakes the antenatal care of all his patients.

Seven miles away in another direction there is a general practitioner maternity unit of 20 beds. A consultant is available to give advice and deal with problems in labour or the antenatal period at the practitioner's request. This is essentially a unit for normal midwifery, and selection of cases is necessary.

THE MATERIAL

An attempt is made to give primiparæ the opportunity of choosing their place of confinement. Those primiparæ who had their baby at home chose to do so, those who were confined in the consultant hospital chose it because of its geographical situation, its reputation, or were encouraged to have their baby there by the practitioner on account of the time of year

(the first quarter is a general practitioner's busy time), or merely were not given the alternative because the practitioner felt (usually erroneously) that they would be difficult to manage in labour. The general practitioner unit would have been used more often for primiparæ if it had been situated nearer to what is essentially an urban practice. Multiparæ had no choice and, apart from those with obstetric indications, all were confined at home. After delivery, and in subsequent pregnancies, almost all expressed a preference for home confinement. Two multiparæ booked for delivery in

	Home	G.P. Unit	Consultant hospital	Total
Primiparæ	13	33	33	79
Multiparæ	128	16	27	171
Total	141 (56%)	49 (20%)	60 (24%)	250

TABLE I.—Place of delivery.

Indications	G.P. unit	Consultant hospital
Primiparæ	33	33
Previous toxæmia	4	7
Previous forceps	2	2
Previous post-partum hæmorrhage	1	1
Social	4	1
Other indications*	5	7

**G.P. unit.*—Grand multipara, previous third-degree tear, previous stillbirth, previous manual removal of placenta, maternal epilepsy.
Consultant hospital.—Previous breech delivery, previous Cæsarean section, previous venous thrombosis, bicornuate uterus, diabetes mellitus, rheumatic heart disease (2 cases).

TABLE II.—Indications for hospital confinement.

the consultant hospital had their babies at home by subterfuge. Sixteen of those delivered at home were grand multiparæ (five or more pregnancies). These people will not go into hospital and in this area they give force to their arguments by pointing out the distance.

The remainder of the mothers delivered in the consultant hospital (9), were booked at home and transferred for delivery. Four were in labour: two for uterine inertia (causing midwife fatigue), one premature labour at twenty-eight weeks, and one placenta prævia. Five were transferred during the antenatal period: two with rhesus antibodies in maternal blood, and one each for breech presentation, disproportion, and postmaturity. Five others were transferred to hospital after delivery: two for prematurity, two for fœtal abnormalities, and one on the sixth day with pelvic vein thrombosis. Details of the place of delivery and of the indications for hospital confinement are shown in tables I and II.

ANTENATAL CARE

An afternoon is set aside for an antenatal clinic. The district midwife is present and shares in the work. Not only does she give valued assistance in

the operation of the clinic, but she pays particular attention to the cases which she will deliver. This arrangement provides opportunity for exchange of views with the midwife, an increase in mutual confidence, and the elimination of pig-headed prejudice on both sides. The patients are seen monthly until 28 to 30 weeks, fortnightly until 36 weeks, and then weekly.

Chest x-ray.—No significant abnormalities were detected.

Blood examination.—Thirteen per cent. of the mothers were rhesus negative, and two developed antibodies: one of these developed hydrops fœtalis, and the other had a normal baby who did not require treatment. Anæmia was treated as indicated. Two mothers had positive Wassermann reactions and were given routine courses of penicillin. The babies were clinically and serologically examined.

External cephalic version was always attempted when a breech presentation was detected. After the thirty-second week nine versions were attempted with varying degrees of success. Five were done by the practitioner, two at the consultant hospital, and two were transferred to hospital for delivery as the consultant was also unsuccessful. In recent months the practitioner has lost his touch and refers more for version.

Toxæmia of pregnancy.—There were 28 mothers (11 per cent.) in whom one or more of the three classical signs were present: 12 primiparæ and 16 multiparæ. The patients were faithfully weighed, but this gave little help in the diagnosis, it being extremely difficult to differentiate between fluid gain and tissue gain. A little dietetic advice was proffered to those overweight at the first visit. In 14 cases treatment was confined to emphasizing the need for rest, salt restriction and, to a lesser extent, reduction of the carbohydrate and fat intake. Stricter measures were required in the other fourteen. Four were put on to strict bed rest and sedation at home, followed by a medical induction. Four were admitted to the consultant hospital, where they had been booked for delivery, and five to the general practitioner unit, where they were induced surgically if medical induction at the moment of choice had failed (as it usually did).

Ante-partum hæmorrhage.—This occurred in three cases: one central and one marginal placenta prævia, and one in which no cause was found.

Other odd abnormalities detected antenatally included a bicornuate uterus, multiple fibroids undergoing degeneration in an elderly primipara, retention of urine in a retroverted gravid uterus, one case of rheumatic heart disease, and a stoical patient who arrived for her appointment suffering from acute anterior poliomyelitis. Eight patients other than those for version were referred to the consultant during the antenatal period: three on account of a high head at thirty-six weeks, two for postmaturity, two for uterine prolapse, and one unstable lie.

THE CONFINEMENT

The mothers delivered in the consultant hospital are not considered here, except to note two Cæsarean sections—one for placenta prævia and one

elective section in a diabetic, and also one case booked for hospital, who was an undiagnosed breech and had an intra-partum death. This could be ascribed to the bi-partite system of antenatal care, where one medical officer unconsciously perpetuates the error of the other—and must be regarded as a failure.

Of the 190 delivered under the care of the general practitioner, 176 (92 per cent.) had normal deliveries; 111 were seen in labour and of these the practitioner was present at the moment of delivery in 49. The policy adopted was to see as many as possible in labour, and to be present at the delivery when difficulties were anticipated. The reasons behind this policy are twofold: (i) midwives prefer to be on their own; (ii) if there is any difficulty it is easier to make a decision coming fresh to a case.

Breech delivery (1.6 per cent.).—One undiagnosed breech (4½ pounds [2 kg.]) was delivered at the unit. One unbooked case was delivered in this way, and two who were known to the practitioner but did not attend for antenatal care. One of these was a 35-year-old primipara in an isolated cottage, who had a complete extraction with forceps on the aftercoming head.

Forceps delivery (4.7 per cent.).—Three were undertaken in the home: two for delay in the second stage, and one for deep transverse arrest. Six more were done in the unit, all in primiparæ: four for delay in the second stage, one for fœtal distress, and one for deep transverse arrest.

Manual removal of placenta (3.1 per cent.).—This was undertaken once in the home, and five times in the unit. This high proportion can be ascribed to injudicious (but perhaps correct) use of intramuscular ergometrine before completion of the third stage. Most of the cases of retained placenta, for which help was requested by the midwife, were dealt with by using intravenous ergometrine, and assisting the contraction with a modified Credé expression.

Post-partum hæmorrhage (2.1 per cent.).—Three cases occurred in the home and two in the unit. Of those in the unit, one (with a previous history) required transfusion, and the other digital evacuation of a cotyledon. Two in the home were treated with intravenous ergometrine and morphine. The third was an extensive hæmorrhage discovered four hours after delivery; transfusion was started in the home, and the patient transferred to hospital where the membrane was removed. Intravenous ergometrine, given with the birth of the anterior shoulder, was used in all operative deliveries and in those at which the practitioner was present.

Repair of perineum (34 per cent.).—This was required in 64 cases, 12 of which had had episiotomy: 33 were done in the home and 31 in the unit. Local anæsthesia was used in all cases except one, who had a formal repair of an extensive third-degree laceration by a consultant. Two repairs broke down but healed satisfactorily on conservative treatment. Episiotomy would certainly have been used more often if the practitioner had been present.

Consultant opinion was sought during labour in one case only. This was in a long labour in which progress was very slow, in spite of good contractions. She was delivered by forceps in the unit by the practitioner.

ANÆSTHESIA

Pethidine, gas and air, and trilene were used in labour. For operative procedures in the home atropine was always given and chloroform used exclusively. No complications were experienced, lulling one into a sense of false security. In the unit, gas, oxygen and ether were used; although no figures are available the impression is that this gave more trouble with vomiting.

The technique of pudendal block has now been learnt by the practitioner, and its influence on the rate of forceps delivery will be interesting to observe.

THE PUERPERIUM

Mothers are visited on seven, or more if necessary, occasions following delivery. Feeding problems and the naming of the baby are discussed in about equal proportions. On one of these visits the baby is examined, and minor abnormalities detected and corrected. Breast abscess was treated on two occasions, one requiring incision. Five mothers had an infection of the genital tract, the two most severe had been delivered in hospital and returned home on the third day. Culture showed hæmolytic streptococci on two occasions. Puerperal infection is serious in the home as it automatically puts the district midwife out of action.

Two mothers had a degree of puerperal psychosis. Appropriate steps were taken for the safety of the baby, and they were successfully managed by the patients' families with advice from the practitioner-midwife team.

Post-natal examination.—All except three attended for this. Retroversions, cervical erosions, fibroids and uterine prolapse were noted. In only one case was treatment given. A watch-spring pessary was inserted for a large cystocele producing symptoms. The three who did not attend stated that they saw no point in the examination, with which I agree. It may afford opportunity for asking questions, but the general practitioner is always available for this, often in the street.

FŒTAL LOSS

Seven fœtuses (2.8 per cent.) were either stillborn or died within the first ten days of life. Three were stillborn in hospital: one undiagnosed breech, one premature labour at 28 weeks, and one hydrops fœtalis. One was stillborn in the unit following medical induction for death *in utero*. In this case there was a large retroplacental clot, a macroscopically normal placenta, and no clinical evidence of toxæmia.

There were three neonatal deaths: one in the home on the tenth day with fulminating pneumonia, one case of Hirschsprung's disease transferred to hospital when 36 hours old, and one in hospital following a difficult forceps delivery. These figures represent the challenge and make disturbing reading. Two could certainly have been avoided by better obstetric practice, but it is easy to be wise after the event.

CONCLUSION

It is said that midwifery is the backbone of every practice and an attempt has been made in this survey to show that it can still be so. A high domiciliary rate (56 per cent.) has been achieved safely by selecting patients with particular reference to their obstetric history. Each history of 'blood pressure' or 'hæmorrhage' was gone into carefully and its merits assessed before referring the patient to hospital. A further 20 per cent. were delivered in a general practitioner maternity unit, and all were given routine antenatal care by the practitioner of their choice.

A PERSONAL EXPERIENCE OF FORCEPS DELIVERIES

The Value of Balanced Counter-Pressure

By WILLIAM G. DAWSON, M.B., B.Chir., D.A., D.Obst.R.C.O.G.
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My records as a general practitioner obstetrician and anæsthetist show eight anæsthetics for forceps delivery for seven operators during the last two and a half years, and during the same period I have delivered eleven of my patients with forceps. My partner delivered one of my patients in my absence and the figures are complete with the record of one case in which I failed to rotate an occipito-posterior presentation, but exchanging ends with the anæsthetist produced the desired result.

Experience in this dual role has suggested an aid to forceps extraction which I believe is neglected. It is most useful when carrying out a slow step-by-step extraction from the pelvic mid-cavity especially when the presentation is favourable but the pains may be poor and the soft tissues resistant, as may occur in the primiparous patient of 30 or more. Such cases comprised five of my own patients; a sixth was the aftercoming head of a breech delivery in a primiparous patient of 35 years.

Using the labour-ward bed the anæsthetist may find himself struggling to keep the patient from being dragged off the bed and anxious about the patient's stretched cervical region as he strives to hang on to his end of the patient. On occasion when a persistent occipito-posterior presentation is being delivered the patient's pelvis may even rise alarmingly from the bed.

BALANCED COUNTER-PRESSURE

The remedy is carefully balanced counter-pressure to assist the frictional resistance of the patient's weight. One foot is placed on the bed-rail and the knee exerts counter-pressure upon the patient's ischial tuberosity. The force necessary to achieve descent is better controlled and delivery is carried out as usual with suitable pauses when the blades are separated.

Surprisingly, there are numerous advantages to be reaped from this point of technique. It is possible to estimate better the effect of each pull and the head is far less likely to crown unexpectedly due to sudden overcoming of the resistance of the tissues. The operator alone is aware of the amount of effort he is employing and a sense of struggle does not communicate itself to others who can already be physically or emotionally exhausted. The operator is also quite safe. If the forceps slip with traction along the plane of the patient's trunk he is unlikely to have to retire with head injuries, as I have known to occur, since he is not exerting counter-pressure with his feet as in a tug-of-war. Counter-pressure helps to give the operator a sense of poise and security without which forceps are sometimes abandoned, or advice is sought unnecessarily as a trial of adequate traction has not been made.

It may be argued that counter-pressure should be exerted upon the shanks (Pajot's manœuvre). This is I think only partially true since there is a point in delivery from the mid-cavity when traction should be in the line of the patient's trunk and there downwards pressure on the shanks, although steadying the patient and the manœuvre, also bruises the tissues unnecessarily.

My partner and usual anæsthetist is emphatic that, relieved of counter-traction, he is better able to perform his other tasks which comprise at least anæsthetizing the patient, oxygenating the fœtus and injecting ergometrine.

THE USE OF A NEW TRANQUILLIZER IN DOMICILIARY MIDWIFERY

By J. A. C. TERRY, M.B., B.Ch.
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Fluopromazine ('vespral'), a phenothiazine derivative which is chemically related to chlorpromazine and promethazine (fig. 1), was first synthesized at the Squibb Institute for Medical Research in 1955. Pharmacological

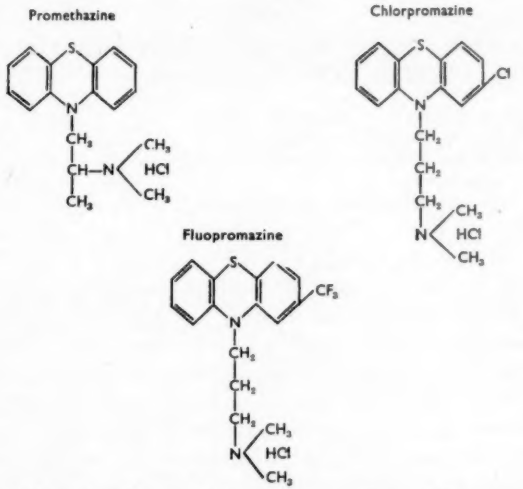

Fig. 1.—Formulæ of promethazine, chlorpromazine and fluopromazine.

studies in various laboratory animals showed it to possess excellent sedative and depressant properties and to be three to five times as active a tranquillizing agent as chlorpromazine. Whilst by itself it produced minimal analgesic effects, it potentiated the action of morphine and other drugs.

Since its introduction, it has been widely used in the treatment of psychiatric disorders (Hanlon *et al.*, 1958; Hegarty, 1958), as an anti-emetic agent (Moyer and Connor, 1958; Bellville *et al.*, 1959), for pre- and post-operative sedation (Davies *et al.*, 1959; Lear *et al.*, 1959; Zeedick, 1960) and in the treatment of alcoholism (Goldman, 1959; Gruenwald *et al.*, 1960). So far, little has been published in this country on its value as an adjunct to the usual analgesics used in current obstetrical practice. This short report presents the clinical results and impressions obtained from its use in domiciliary midwifery.

SCOPE OF INVESTIGATION

In this trial fluopromazine was used in a total of 12 patients whose ages varied from 16 to 31. Six of these were primiparæ; only one patient in this series had a previous history of obstetric complications, as such cases are booked for hospital confinement and would therefore be excluded from this type of trial.

Dosage.—In all cases 15 mg. were given intramuscularly, with 50 mg. of 'pethilorfan' (pethidine-levallorphan) by the same route. The drugs were usually given at 2 to 3 fingers' dilatation in primiparæ, and at 3 to 4 fingers' dilatation in multiparæ, provided the pains were well established. In only two cases was it found necessary to repeat the combined dose after four hours.

RESULTS

In order that a tranquillizing drug may be used safely and effectively in obstetrics, it must fulfil the following conditions:—

(1) It must produce calmness and mild sedation.
(2) It must potentiate analgesic drugs.
(3) It must allow the patient to cooperate.
(4) It must be non-toxic.
(5) It must have no ill effects to the mother or the fœtus: e.g. respiratory depression.

In eleven of the patients, fluopromazine induced a state of calmness without undue drowsiness and enhanced the analgesic action of 'pethilorfan', so allowing the patients to relax and sleep between contractions while they remained sufficiently alert to cooperate. This in effect reduced the average duration of labour. The average time taken for full dilatation after the injection was 3.2 hours for primiparæ and 2 hours for multiparæ.

In no case was there any depression of maternal or fœtal respiration. In one case there was some indication of mild uterine inertia, and one other patient complained of 'lightheadedness' on sitting upright. This may have been due to a hypotensive action, which can occasionally occur with fluopromazine, but this would seem unlikely in view of the small dosage employed. In one case no other form of analgesia (such as gas and oxygen) was required, whilst in the remaining cases it was only needed in the second stage. The only patient who did not respond adequately to fluopromazine

was one admitted to hospital for a forceps extraction for mild disproportion. The patient previously referred to, who, due to anxiety, had to have a low forceps delivery in her first pregnancy, was delivered normally in her second confinement following the use of fluopromazine.

DISCUSSION

Since the advent of the tranquillizing group of drugs during the past decade, many have been used in obstetrics, including chlorpromazine and promethazine, but these have been found to possess various undesirable side-effects, such as jaundice, and pain and irritation at the injection site. Although most of the phenothiazine compounds may cause irritation to tissue, no local reaction or prolonged soreness at the site of injection was encountered with fluopromazine, either at the time of the injection or afterwards. It should be remembered that, in common with the other phenothiazines, fluopromazine may be toxic to the liver, and should therefore be used with caution in patients with pre-eclamptic toxæmia.

The present trial underlines the twofold action of fluopromazine in obstetrical practice. Its first effect is to induce a state of calmness which is reflected in the degree of relaxation and cooperation evident in each case. The second effect is the potentiation of the analgesic action of 'pethilorfan', and in this series only two patients required further medication four hours after the initial injection.

SUMMARY

Fluopromazine ('vespral'), a phenothiazine derivative, would appear to be a safe and useful drug as an adjunct to the usual analgesics in obstetrical practice.

In a series of 12 confinements in general practice it induced a state of calmness without undue drowsiness, and enhanced the analgesic action of 'pethilorfan' in 11 cases.

It produced relatively few side-effects and is easy and painless to administer.

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GENERAL PRACTITIONER CLINICAL TRIALS

A COMPARISON OF TWO TABLET ANTACIDS

IT has been suggested that continuous alkali medication, which has been referred to as 'drip therapy', is likely to prove more beneficial to sufferers from peptic ulceration and other gastric disorders, than the intermittent consumption of alkalis at mealtimes. Although theoretically there may be something to be said for this proposition, it may well be that this form of treatment may be neither practical nor acceptable to the ambulatory patient going about his everyday life. The production of tableted alkaline preparations, which can be sucked continuously, represents an attempt to facilitate this form of treatment in general practice.

SCOPE OF INVESTIGATION

Recently a preparation of aluminium hydroxide-magnesium carbonate co-dried gel ('almacarb') has been formulated for which it is claimed that more rapid relief and more efficient acid neutralization occurs, than with other similar preparations. In order to test this claim, it was decided to treat a series of patients seen in general practice, for alternating weeks with either 'almacarb' or 'aludrox' compound tablets, a similar preparation but produced in a more conventional manner. It is claimed that the new process for including aluminium hydroxide gel in the 'almacarb' formulation is responsible for superior activity. It was decided to include in the trial all cases of peptic ulceration, dyspepsia, and hiatus hernia, with the exception of acute mild dyspepsias which are likely to clear up within a week or two. The trial was therefore confined, so far as possible, to long-standing cases, so that any relief of symptoms observed might be attributable to the treatment given, rather than to spontaneous remission of symptoms. The drugs were alternated for weekly periods over a month in each patient, and the order of giving the drugs in the weekly periods was also alternated from patient to patient, in order to overcome, so far as possible, progressive amelioration of symptoms once any form of treatment had been initiated.

A total of 64 patients was studied, of whom 38 were suffering from peptic ulcer. Other conditions treated were chronic gastritis, pregnancy heartburn and hiatus hernia. The male cases were mainly concentrated in the 31 to 60 age-group, whereas the female cases were fairly evenly distributed between the 31 to 60 and 61 and over age-groups. The majority of these patients had had symptoms for four or more years, and over one-third of them had had symptoms for over nine years. Treatment was started early in the particular exacerbations studied, as two-thirds of the patients had only had symptoms for between one and four weeks, when treatment was started.

Generally speaking, the data for all these factors was similar from the different practices.

Of the previous treatments given, magnesium trisilicate, in powder or mixture form, had been by far the most popular and had resulted in a 35 per cent. complete relief of symptoms, 45 per cent. partial relief of symptoms; 20 per cent. obtaining no relief of symptoms. A number of well-known proprietary preparations had also been used by the participating doctors, and when all these previous antacids are put together, the com-

Week	Antacid	+	±	−	Total cases treated
1st	'Aludrox'	9 (32%)	15 (54%)	4 (14%)	28
	'Almacarb'	20 (55%)	10 (28%)	6 (17%)	36
2nd	'Aludrox'	7 (28%)	15 (60%)	3 (12%)	25
	'Almacarb'	15 (58%)	9 (35%)	2 (7%)	26
3rd	'Aludrox'	9 (50%)	6 (33%)	3 (17%)	18
	'Almacarb'	14 (54%)	10 (39%)	2 (7%)	26
4th	'Aludrox'	6 (30%)	12 (60%)	2 (10%)	20
	'Almacarb'	9 (50%)	8 (44%)	1 (6%)	18

+ = complete relief of symptoms; ± = partial relief; − = no relief.

TABLE I.—Results in patients treated with 'aludrox' and 'almacarb' alternately for four weeks.

plete success rate was improved to 50 per cent., with 41 per cent. partial relief of symptoms and only 9 per cent. obtaining no relief of symptoms. Antispasmodics had generally not been used very much in these patients.

RESULTS

The results for the different weekly periods of the trial are shown in table I. In order to obtain a comparison of the results from the different practices, the total +, ± and − results have been added together for all the weeks in each individual practice, and these results are shown in table II. Generally speaking, with the exceptions of Doctors C and E, these results are similar to the over-all results from the whole trial, showing the superiority of 'almacarb' over 'aludrox' in the individual practices. With regard to Doctors C and E, the results were very similar with both 'aludrox' and 'almacarb'.

It is seen that rather more cases were treated with 'almacarb' in the first week than 'aludrox', and similarly in the 3rd week, but that in the 2nd and 4th weeks approximately equal numbers were treated with the two drugs. These figures show a better response to 'almacarb', since more patients obtained complete relief of symptoms with 'almacarb' than with 'aludrox', in weeks 1, 2 and 4 of the trial. In the 3rd week, the figures for complete relief of symptoms are almost the same, although 'almacarb'

is again slightly superior. Conversely, with the exception of the first week, there were fewer patients taking 'almacarb' who obtained no relief of symptoms, than with 'aludrox'. It was often noted that the taste of 'almacarb' was preferred to 'aludrox', and that relief of symptoms appeared to be quicker with 'almacarb' than with 'aludrox'. Of 29 patients who expressed a preference for one or other drug, 28 expressed a preference for 'almacarb'. Side-effects were negligible with either preparation, although seven patients complained of unpleasant taste with 'aludrox', whereas only two patients complained of this with 'almacarb'.

In order to complete the evaluation of the effectiveness of 'almacarb', it is necessary to compare the best results obtained in any one week with the

	'Aludrox'			'Almacarb'		
	+	±	−	+	±	−
Dr. A	4	5	3	11	4	1
Dr. B	6	4	−	13	1	−
Dr. C	4	3	1	3	3	2
Dr. D	4	7	3	5	8	1
Dr. E	2	4	−	3	5	1
Dr. F	5	12	2	8	10	3
Dr. G	4	7	3	5	6	3
Dr. H	2	6	−	6	4	−
Totals	31	48	12	54	41	11

TABLE II.—Showing results in patients treated with 'aludrox' and 'almacarb' in eight different practices.

results obtained with the previous treatments. If we do this, we see that in the 2nd week, there was a 58 per cent. complete relief of symptoms, 35 per cent. partial relief of symptoms, and 7 per cent. no relief of symptoms with 'almacarb'. This can be compared with the over-all figures obtained with all the previous treatments, which were: complete relief of symptoms 50 per cent., partial relief of symptoms 41 per cent., and no relief of symptoms 9 per cent. It is seen therefore that in this respect also 'almacarb' shows some slight advantage over the previous treatment used.

CONCLUSIONS

This comparative trial, which was based upon clinical impressions of doctors and patients alike, showed an over-all superiority for 'almacarb'. There was some reduction in numbers in the latter weeks of the trial, owing to patients either defaulting, requiring no further treatment or preferring some other remedy. This is probably a true result, although it might have been better to conduct this trial as a 'double blind' study, as it is not completely possible to exclude bias in favour of the newer preparation. This seems unlikely, however, since the results were so similar from the eight different practices.

The over-all results with 'almacarb', in the best week of the trial, were

slightly better than those recorded for previous treatments, but did not show a sufficient improvement, generally, to encourage the participating doctors to abandon those previous treatments in favour of 'almacarb'. It was also commented that treatment of these gastric disorders is, by tradition, generally in the form of powder or medicines, and patients generally appear to prefer those particular forms of medication. 'Almacarb' was virtually free of side-effects.

To sum up therefore, the final conclusion is that, on the results of this trial, 'almacarb' was shown to be superior to 'aludrox' compound tablets, but that the participating practitioners generally felt that their previous remedies were quite efficient, and that they would only use 'almacarb' in certain selected cases.

The following practitioners took part in this investigation:—
Dr. B. L. Bisley, Twickenham, Middlesex
Dr. D. J. Davies, Swansea, Wales
Dr. H. J. Giwelb, E. Finchley, London, N.2
Dr. S. S. Rowell, Blackheath, London, S.E.3
Dr. J. M. Stewart, Portsmouth, Hants.
Dr. H. W. K. Thompson, Warrington, Lancashire
Dr. K. M. Townend, Easton-in-Gordano, Bristol
Dr. D. Wheatley, Twickenham, Middlesex

This is Report No. 8 of the General Practitioner Research Group.

A NEW FUNGICIDE

AMYLOXYBENZAMIDE ('amoxal') is claimed to have fungicidal properties, and this trial was undertaken to test the effectiveness of the powder in the treatment of common fungus infections seen in general practice. Although this product is available also as a cream and gel, these preparations also contain salicylic acid, and only the dusting powder contains the plain active ingredient, amyloxybenzamide. It was anticipated that a dusting powder would possibly not be entirely effective in those cases in which the infection was chronic and deep-seated in horny skin areas, such as the sole of the foot. Nevertheless, we wished to form an opinion as to whether the substance itself did in fact have fungicidal properties, and therefore it was decided to use the powder on all types of fungus infection. The diagnoses were made on clinical grounds, since it is not usual to undertake fungus isolation in these well-known conditions in general practice.

SCOPE OF INVESTIGATION

Four practitioners took part in this trial and a total of 32 patients was studied (table I).

As we expected, epidermophytosis of the toes was by far the commonest infection encountered and the men outnumbered the women by 2.5 : 1.

There was a wide variation in the ages of the patients, the youngest being 1½ years (interdigital epidermophytosis) and the oldest 75 (acute epidermophytosis). The acute cases tended to appear mainly in the younger age-groups and the chronic cases in the older patients. The powder was dusted

		Male	Female	Total
Epidermophytosis	Acute	11	6	17
	Chronic	8	2	10
Tinea cruris	Acute	3	—	3
	Chronic	1	—	1
Interdigital	Chronic	—	1	1
Totals		23	9	32

TABLE I.—Classification of 32 cases of fungus infection treated with 'amoxal'.

on to the affected areas, and also into the socks or stockings, night and morning, and treatment was continued as long as necessary.

RESULTS

The results (table II) show that more than half the patients using the 'amoxal' powder were cured of their infection, and the percentage of cures was higher in the acute cases than in the chronic cases. Nevertheless, 50 per

		+	±	−
Epidermophytosis	Acute	11 (65%)	4 (23%)	2 (12%)
	Chronic	5 (50%)	3 (30%)	2 (20%)
Tinea cruris	Acute	2	1	−
	Chronic	−	−	1
Interdigital	Chronic	−	−	1
Totals		18 (56%)	8 (25%)	6 (19%)

+ = Completely successful (rapid resolution without recurrence).
± = Partially successful (slow resolution or continued relief only while using the powder).
− = No effect.

TABLE II.—Analysis of results obtained with 'amoxal' powder in 32 cases of fungus infection of the skin.

cent. of the chronic cases of epidermophytosis cleared up completely with the treatment. No comparison was made in this trial with other fungicidal agents, but in our experience with such other agents, these figures were considered to be quite satisfactory. In the cases which were completely

cured the average number of days for cure were: acute cases seven days, chronic cases eleven days. Again, the time for cure with amyloxybenzamide compared favourably with previous experience with other fungicidal agents. This may be considered particularly satisfactory, since we were only using the powder for treatment of these cases. The subsequent fate of those patients in whom treatment was only partially effective or completely ineffective was as follows:—

Eventually cleared up slowly	2
Cleared with other fungicides (2 ointments; 1 powder)	3
Cleared with 'amoxal' cream	1
Remained uncured	3
Secondary infection—other treatment needed	2
Cheiropompholyx developed	1
Unrecorded	2

In some cases, particularly when the horny sole of the foot is infected, a keratolytic agent may also be required to ensure penetration of the fungicidal compound, and one such case did in fact subsequently respond to 'amoxal' cream which contains salicylic acid. No side-effects of any description were recorded.

CONCLUSIONS

We concluded that this trial demonstrated that amyloxybenzamide has a definite and satisfactory fungicidal action, comparing well with our experience of other fungicidal drugs. One advantage of the powder form, particularly when applied to the feet, is that the powder is also dispersed into the covering garment. Socks and stockings commonly perpetuate infection and a powder would seem to be superior to an ointment or a cream in disinfecting articles of clothing as well as the infected skin. Further, ointments often leave grease marks on clothes or even penetrate through the leather of shoes, and these marks are often very difficult to remove. A powder form of a fungicidal drug is therefore very useful for treatment in general practice, particularly if ointment preparations are also available for those cases which do not respond to the powder.

The following doctors took part in this trial:—
Dr. B. L. Bisley, Twickenham, Middlesex
Dr. R. V. H. Goulder, Hitchin, Hertfordshire
Dr. D. F. Parkin, Guildford, Surrey
Dr. David Wheatley, Twickenham, Middlesex

This is Report No. 9 of the General Practitioner Research Group.

SECTION OF GENERAL PRACTICE OF THE

ROYAL SOCIETY OF MEDICINE

DISCUSSION ON GENERAL PRACTICE IN A CHANGING WORLD

March 15, 1961

Dr. John H. Hunt (*London, S.W.*1).—Eleven years ago, on the day the Collings' Report was published—March 25, 1950—a leading article in *The Lancet* said: 'We have to decide what the general practitioner should be doing and then—whatever it is—enable him to do it properly'. The significant words are 'whatever it is'. Until we know just what he should be doing, we cannot tell how many doctors we need, how they should be trained, what equipment and premises they require, or how they should work.

DIFFERENT TYPES OF GENERAL PRACTICE

There are, of course, all kinds of general practice—family doctoring, school doctoring, factory, ship and Service doctoring and so on—and the varieties of each can be multiplied indefinitely. No two civilian practices are exactly the same. As an extreme example there are the flying doctors with whom I flew in Tasmania and Australia who do all the ordinary work of general practitioners, except that they travel by air instead of by car. Some of their patients live 400 miles from the nearest doctor or chemist (as far as from London to Aberdeen) and are only connected with them by rough tracks crossing unbridged rivers. One can imagine what it must have been like to suffer a fractured femur under these conditions, or to have a perforated appendix or duodenal ulcer, before the flying doctor service brought to these people what has been so aptly called a 'mantle of safety', giving them a sense of security, and freedom from isolation and fear, for which they are extremely grateful.

The importance of flexibiiity.—No-one in any country should generalize too much about general practice. I have made the plea before, and I would like to make it again, that every Health Service should be kept flexible and be looked upon as a long-term experiment, so that it can develop and evolve when other countries have something to teach it. The danger, when any service becomes too highly organized, is that evolution cannot easily take place. Our National Health Service was planned, sums of money were set aside, and rules and regulations were made, before we really knew what general practitioners should be doing. When we have decided that, great changes may be needed.

GENERAL-PRACTITIONER CENTRES

I believe that in this country we should encourage the development of 'general-practitioner centres'. In the reforming zeal after the 1939-45 War, it was thought that health centres might provide these for us, but they have been somewhat disappointing. Such centres should have whatever the general practitioners in the district need; i.e. a common room where the doctors can meet and have coffee or tea (or even a buffet lunch) and meet the local-authority and social workers, a small library, a room for dressings and other nursing care (with a nurse in charge), perhaps a minor operating theatre, a pathology laboratory, an x-ray apparatus, and an electrocardiograph. Every such general-practitioner centre will be different, depending upon the number of doctors using it (from 5 to 50 or more), how far they work from their nearest hospital, and how much help this hospital gives them. We are watching with great interest the Centre that has recently been opened at Peckham—the South East London General-Practitioner Centre (serving about 80 family doctors)—and the one being built as an annexe to the new Charing Cross Hospital. Neither may be a complete success; but we are certain to learn something from them, and they are steps in the right direction.

Ancillary services.—We have so many ancillary services for general practitioners now in our cities, that I am just a little afraid of the dangers inherent in having too large a health team. Some doctors may have ten or more different helpers: e.g. receptionists, secretaries, surgery nurses, district nurses, midwives, health visitors, psychiatric social workers, almoners, maternity and child welfare and school health workers, dietitians, physiotherapists, rehabilitation and occupational therapists. We must recognize that many people prefer a single doctor friend to a panel of medical advisers and acquaintances, and I do not believe that a committee can ever replace a good family doctor. If there are too many members of the team, they are liable to work independently, perhaps giving differing or contradictory advice. If they work too closely together, an extra psychologist may be needed, as Dr. Silver hinted recently, to sort out the interpersonal relationships between different members of the team.

GENERAL-PRACTITIONER HOSPITAL BEDS

Some people say that family doctors in this country are so busy that they do not need hospital beds; others suggest that every patient ill enough to be admitted to a hospital bed needs a specialist. Personally I have never been convinced that when a patient with a general-practitioner complaint, such as a boil on his leg, a sprained ankle, or lumbago, has to go into a hospital bed just because there is no-one to cook or care for him at home, he always needs to be looked after in that bed by a specialist. I can see no logic in the argument that while such a patient is ambulant he can well be looked after by his family doctor, but as soon as he lies down and assumes the horizontal position he becomes at once, and automatically, a case for

specialist care. At present, a general practitioner in England and Wales, on average, has charge of less than one-half of one hospital bed, which is not enough. In Canada, the United States, New Zealand, and Australia, the majority of general practitioners can put their patients into hospital beds and look after them there themselves. They feel fairly treated, they are in close touch with specialists, and my impression is that their clinical enthusiasm is greater on the whole than it is in many family doctors in our country.

'EROSION' OF GENERAL PRACTICE

I do not agree with the suggestion which is so often made that general practice is being 'eroded' or 'dissolved away' by the work of the specialists, and that family doctors are now working only as 'residual legatees' with 'what is left over'. The scope of general practice has increased enormously during the past few years, and so much that is well worth while has been added to it, that drastic pruning is now necessary—to cut out everything which other people can do better than we can, so that we may concentrate on what we can do better than any specialist or hospital. We should not be ashamed of not doing renal biopsies, cardiac catheterization, or lung resections; we should be only too thankful that there are people who will carry out these techniques for us, giving us time to do the work which we alone can do really well.

If anyone tells me that many of the general practitioners in his area are 'rotten doctors', who do not examine their patients or take proper histories, or write good letters to hospitals, I always ask: 'Who selected these peculiar men and women to be medical students, who taught them, and who decided the conditions under which they should work?'. If the general practitioners in any area are really poor, it is a serious indictment of their selection, their training, or the conditions under which they have to work. In the training of family doctors of the future, general practitioners will almost certainly have to play an increasing part in student selection, student attachment, as general-practitioner advisers to teaching hospitals, in departments of general practice, in general-practice teaching units, and even in chairs of general practice in the universities which I believe will come in time.

THE NEED FOR GOOD GENERAL PRACTICE

Nearly everyone seems to agree that good general practice is still essential for any medical service. There is an urgent need everywhere to fit general practice into the framework of modern medicine. Rather than deny its existence, or change its name, I believe that our job is to train more students properly in this branch of our profession, and to raise its standard and its status so that anyone will be proud to join it.

Collectively, our responsibility in this is to the Commonwealth, if not to the whole world; we have a unique opportunity to give a lead to other countries and to set them an example. Individually, the personal responsibility of each one of us is the welfare of our *own* patients in and near their

homes. It is not only the flying doctor's patients who appreciate the mantle of safety, comfort and guidance which a good family doctor can spread over them; most other people appreciate it, too—even in the largest cities.

Dr. T. F. Fox (*Editor, The Lancet*).—In a closely packed society, with good transport and telephones, do people still require their own doctor round the corner? My impression is that before very long the American public in cities may be content to get all their medical care from groups based on hospitals. And such groups can in fact do everything better than the independent practitioner—except that they cannot give the same kind of *personal* medical care. How much does this matter? Our answer will depend upon whether we believe that the doctor exists to look after people or to look after diseases. Many people feel that the centre of gravity—the heart—of medicine is in the hospital, and that all the outside practitioner has to do is to ensure that any disease needing active treatment is spotted quickly and referred to the specialist.

With distances shortening, however, we cannot go on claiming autonomy for the private practitioner if his function is only to be be a sorter of diseases. Important though this function is, it could be performed at least as well by a group of specialists at the local hospital.

CONTINUOUS CARE

To justify the independent practitioner we have to accept the opposite concept: that medicine consists in the continuous care of people. The hospital is auxiliary to the practitioner, not the practitioner to the hospital. This second concept is surely the right one. As the specialties get cleverer and more diverse, the patient has more (not less) need of a wise doctor who will look after him as a person, in relation to his family, his work, and his other circumstances—who will sometimes send him to a specialist but sometimes stop him going to one.

If we want the independent general practitioner to survive, he must concentrate on the only work that cannot be done equally well by the hospital. He must become above all a personal doctor. And this means a gradual change in our idea of general practice. The personal doctor cannot do his work well unless he really knows his patients and listens to their troubles. In our profession some think that all the time to which a patient is medically entitled is the time required for discovering whether he has something seriously wrong: anything more is a luxury which he cannot expect unless he comes as a private patient. But this misconceives the essential function of the independent practitioner, which is to look after the patient as a person.

So far from proposing a lower status for the practitioner I want him to assume more responsibility than most practitioners assume today. He must feel that *he* is the patient's doctor; and to do this he must make his own diagnoses as fully as his facilities and time allow. His judgment will not be

valuable unless he has a very good knowledge of medicine, kept up to date by continuous contact with specialists. Paradoxically, therefore, though the practitioner should resist absorption by the hospital service, he should also draw closer to the hospital.

RELATION WITH THE HOSPITAL

His relation with the hospital may be of two distinct kinds:

(1) All outside doctors who are prepared to cooperate by sending the specialists decent notes, should be made associate members of the staff of the hospitals where they work. As such, they would have free access to any of their patients who are admitted, and on such visits their help would be regularly invited. There should be at least one comfortable room which they could regard as their home in the hospital and where they could meet their specialist colleagues.

(2) Quite apart from this associate membership of the hospital staff, a man who is in personal independent practice should be able, if he wishes, to spend part of his time working in a specialist service, either in the hospital or elsewhere—but only on one condition. If he undertakes work for which the hospital service is ultimately responsible, he must do so as a member of the hospital team, accepting the leadership of a whole-time specialist. These are the only terms on which, in the National Health Service, a general practitioner should undertake obstetrics, or admit patients into general-practitioner beds.

Partnerships of two or three practitioners are usually desirable to preserve the doctor's health and to give him everyday professional support and companionship but, if personal practice is really our aim, we should beware of the larger group with its complex organization. In so far as health centres were to be a sort of half-way house between personal practice and the hospital, the decision not to develop them was perhaps wise after all.

A time may well come when people will say: 'The hospital is the best place for modern medicine; so let's get all our care there'. No hospital group, however, can give continuous personal care of the kind given by the best practitioners today. Believing that such care is really valuable to patients, I consider that to replace the independent doctor by a hospital-based service would be to choose a second-best.

Dr. George A. Silver (*Chief, Division of Social Medicine, Montefiore Hospital, New York*).—Serious thought must be given to the implementation of the ideals of family practice, partly because of the decline of general practice, partly because of the rise of specialism and partly because of the increasing need for family advice and guidance under the pressures of changing social situations and changing medical knowledge. Another element of change in the response to increasing complexity and depth of knowledge of modern medicine, is the development of partnerships and group-practice arrangements. Group-practice growth parallels the growth in specialism. It is clearly an effort to restore unity from the fragmentation of practice which specialism induces.

Group practice, however, simply as an alliance of specialists is not wholly satisfactory. The general practitioner offered the family a focus for centring their care and for adjusting and combining specialist activities.

This role is still necessary in group practice. The family must have access to a person with modern medical knowledge and training, but they must also have access to someone who will help them through the conflicts and helplessness which disease imposes. In addition, the chronic illnesses require more knowledge of human relationships, broader understanding and sympathy with the sick person's needs, as well as greater knowledge of the course of the disease itself. Chronic illness requires more supervision over longer periods of time. The physician must deal with the family and society in a way which acute illness rarely demands.

We are faced with the necessity for planning a medical service that will integrate modern medicine, specialism and accelerating accumulation of medical knowledge, into family practice. The general practitioner in solo practice would be hard pressed to find a place in the scheme under the best of circumstances because of his lack of hospital connexions. Family practice requires social attitudes and willingness to deal with family problems, elements that need to be built into medical education, and should have careful and precise formulation, but family practice also requires a well-trained and adequately prepared physician who is working in a setting that allows him to use and refine his laboratory skills as a modern doctor.

THE MONTEFIORE MEDICAL GROUP

The activities of the family doctors in the Montefiore Medical Group are as follows. Family physicians are internists, have three to five years of hospital experience after graduation from medical school, and are eligible for the Board in Internal Medicine. They have approximately 1,200 patients on their panel, put in 25 hours a week in the office and look after their patients in home, office and hospital. They rotate night and weekend calls and fill in for one another when necessary. Visits to the office are by appointment, and the doctor will allow 15 minutes for a revisit, 30 minutes for a physical examination, and one hour for a new patient. The doctor provides about 4,500 services a year, and gets four weeks' vacation, one week to attend a medical meeting, and other perquisites.

Despite the formal pattern of association in the Group, the family doctor has great freedom of independent action in the way he practises. Thus, the nine doctors in the Service provide from 2.5 to 4 services per patient per year, ranging up to 400 per cent. difference in house calls per year per patient, order radiological and laboratory investigations at rates that vary up to 200 per cent. and refer patients to specialists at rates that vary as much as 500 per cent. As indicated in a study of transfer rates of patients from one doctor's panel to another, patient satisfaction with these varying methods of practice is apparently not modified significantly by the differences.

It is suggested that some special curriculum be devised for training doctors for family practice and that experimental models of different patterns of organization of practice be organized.

CURRENT THERAPEUTICS

CLXI.—LOCAL ANÆSTHETICS

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FEW drugs are more widely used than local anæsthetics, and few have more predictable effects. Their wide usage stems from the apparent ease of administration, their therapeutic effect in relieving pain and their consequent ready acceptance by the patient. Yet it is probable that no other class of drug is used so ineptly and results in so many immediate adverse reactions. Both the failures and complications are brought about by a lack of understanding of a few simple pharmacological facts and technical principles. It will be the aim of this article to review this material in order that local anæsthesia may be more safely and successfully utilized.

THEORIES OF ACTION

Local anæsthetics are applied to the body surfaces and injected about the nerves chiefly to prevent pain in surgical procedures. They are also used in the treatment of injury and disease. Their action is to interfere with the initiation and transmission of the nerve impulse by mechanisms that have been explained on the basis of biochemical and physical changes.

A brief summation of present theory is that local anæsthetics prevent the depolarization of the nerve membrane that is necessary for the propagation of the impulse. This has been thought to be due to interference with the mutual exchange of sodium and potassium ions across the membrane. As a consequence a negative electric potential necessary for a propagated discharge does not develop.

The ester structure of some of the local anæsthetics also suggests that they may compete with acetylcholine, the chemical mediator for nervous transmission.

Nerve fibres vary in diameter and transmit impulses at varying speeds according to physiological function. A group of larger fibres that conduct at the greatest speeds carry motor impulses or sensations of touch, pressure and proprioception. In a fibre of large diameter the surface area is small in relation to the interior. Penetration by the anæsthetic and onset of anæsthesia in these fibres are comparatively slow, and the result is that stronger concentrations of local anæsthetic are required to block transmission of impulses. On the other hand, nerve fibres of smaller diameter, that conduct slowly and carry pain sensation or various autonomic functions, are more readily blocked and by lesser concentrations of anæsthetics. These observations explain why certain sensations may remain intact after nerve injection. The important practical point, however, is that only weak concentrations of anæsthetic need be employed to eliminate most of the painful impulses.

THE ACCEPTABLE LOCAL ANÆSTHETIC

Many local anæsthetics are available. Specialists in fields such as anæsthesia, ophthalmology and otolaryngology prefer certain drugs, but the attitude of a practitioner should be to know a few drugs well, to employ those with the greatest theoretical advantages and to use only drugs that have passed the test of time in critical and experienced hands. The criteria of an acceptable local anæsthetic are as follows: complete reversibility of action; freedom from local irritation and systemic toxicity in the therapeutic range; appropriate time of onset and duration of action; ease of sterilization without loss of activity; an easily synthesized structure; and low cost.

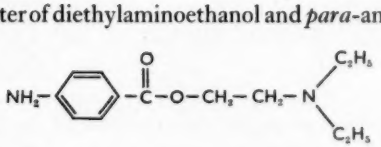
THE ESTER COMPOUNDS

Cocaine, an alkaloid of *Erythroxylon coca*, was the first anæsthetic introduced to medicine, and is still employed today in the form of the acid salt which renders it water soluble. It is used chiefly in otolaryngology in 5 to 10 per cent. concentrations for topical anæsthesia of the nose, pharynx and tracheo-bronchial tree. No more than 200 mg. should be given at a time. The local vasoconstrictive property of cocaine, which is shared by no other local anæsthetic, is especially valuable in decreasing bleeding and preventing rapid absorption of the drug into the circulation. Cocaine hydrochloride has largely been abandoned in ophthalmology because it produces temporary opacity of the cornea and retards corneal epithelial regeneration. The high incidence of toxic reactions after injection of this drug, the liability to addiction and the difficulty in preparing sterile solutions led to a search for a synthetic compound with fewer undesirable properties.

A clue to anæsthetic activity was found in the chemical structure of cocaine, an ester of benzoic acid and the methylated base, ecgonine. Most of the local anæsthetics subsequently synthesized have retained the ester structure and the chemical suffix 'caine' in their nomenclature.

Procaine.—After years of trial in the synthesis of ester compounds with anæsthetic activity procaine was prepared by Einhorn in 1904. Procaine hydrochloride lacks surface anæsthetic activity but is probably the most widely used local anæsthetic today. For reasons of minimal systemic toxicity, lack of local irritation, ease of sterilization, reasonable duration of action and low cost, it is doubtful if procaine will be supplanted by any other drug. Procaine may be injected in 0.5 to 5 per cent. concentrations for any type of anæsthetic procedure ranging from infiltration of the skin to spinal subarachnoid block.

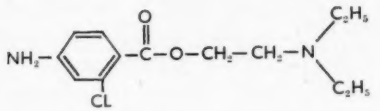
Procaine is the ester of diethylaminoethanol and *para*-aminobenzoic acid:—



The basic part of the ester is a tertiary amino-alcohol that combines with

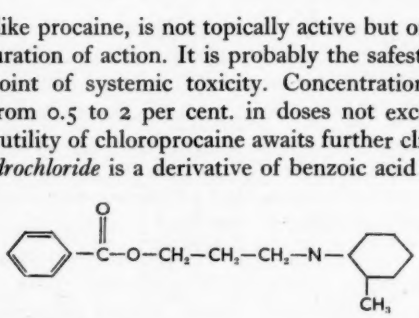
hydrochloric acid to form a soluble salt with a weakly acidic reaction. The other portion of the ester is an aromatic acid. The undissociated molecule provides anæsthetic activity. The ester structure of procaine and similar compounds subjects them to hydrolysis by esterases in plasma, a factor of major importance in detoxification when absorbed into the blood stream. The amino group resembles the quaternary amine structure of neuromuscular blocking agents. Since several of the latter compete with acetylcholine for their effect, some of the side actions of local anæsthetics may be explained by their influence on central and peripheral synaptic transmission.

Chloroprocaine.—Halogen substitution in the aromatic portion of the procaine molecule produces substances that are rapidly hydrolyzed in plasma and therefore even less toxic than the parent compound; chloroprocaine (2-chloroprocaine hydrochloride) is such a compound:—



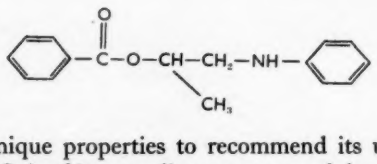
Chloroprocaine, like procaine, is not topically active but of greater potency and shorter in duration of action. It is probably the safest local anæsthetic from the standpoint of systemic toxicity. Concentrations employed for injection range from 0.5 to 2 per cent. in doses not exceeding 1 g. Full realization of the utility of chloroprocaine awaits further clinical use.

Piperocaine hydrochloride is a derivative of benzoic acid:—



It has proved to be a reliable local anæsthetic. Although it produces topical anæsthesia and a longer duration of anæsthesia, there is little to recommend it over procaine for ordinary purposes. It is employed in 0.5 to 5 per cent. concentrations, most commonly 1.5 per cent., for topical anæsthesia and for various injection techniques.

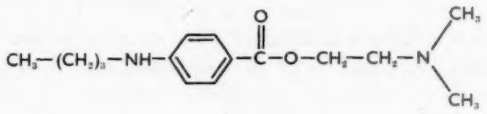
Hexylcaine hydrochloride is a topical and infiltration anæsthetic with the following structure:—



It possesses few unique properties to recommend its use over the drugs already mentioned. It is of intermediate potency and duration and is used in

concentrations ranging from 0.5 to 5 per cent. for topical and injection anæsthesia in doses not exceeding 0.5 g. by injection. Local irritation and necrosis of the skin have been noted after injection.

Amethocaine.—The last drug worthy of mention in the ester series is amethocaine:—

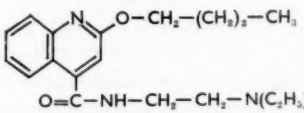


The potency and the duration of action of this compound are greater than those of any other anæsthetic so far mentioned, and the systemic toxicity is correspondingly greater. The slow rate of hydrolysis in plasma explains in part the high incidence of reactions, but the low total dosage required counteracts this disadvantage. Amethocaine is used in 0.1 per cent. concentrations for injection when the duration of anæsthesia required is longer than several hours. In the United States, where it is known as tetracaine, it is probably the most commonly employed anæsthetic in spinal anæsthesia, usually combined with an equal volume of 10 per cent. dextrose to increase the specific gravity and control the spread of the solution. As a topical anæsthetic in the eye, pharynx and tracheo-bronchial tree it is extensively employed in 1 to 2 per cent. concentrations. The rapid rate of absorption from the tracheo-bronchial passages accounts for the many reactions reported. Quantities greater than 80 mg. should not be applied at one time.

THE NON-ESTER COMPOUNDS

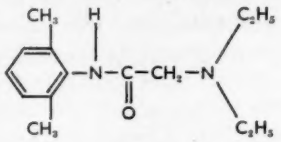
The remaining drugs described are non-ester compounds.

Cinchocaine.—The first of these, cinchocaine, is a substituted amide with the following structure:—



It is an extremely potent anæsthetic with high systemic toxic properties. Again, however, the lower concentrations needed lessen the number of side-reactions. Cinchocaine is used for topical anæsthesia of mucous membranes in 0.2 per cent. concentrations but is rarely used for injection other than in spinal anæsthesia. The dose in either case should not exceed 40 mg. As a spinal anæsthetic in 0.6 per cent. concentration, it is used for relatively long operative procedures.

Lignocaine is an acetanilid derivative with the following structure:—



It has achieved widespread acceptance since its introduction in 1948. The major advantages are rapid onset of anæsthesia and freedom from local irritative effect. The potency and duration of action are moderately greater than those of procaine, and the topical activity seemingly not as effective as that of cocaine. Lignocaine lacks the vasoconstrictive property of cocaine and, because of its non-ester structure, is detoxified in the circulating plasma slowly, if at all. For this reason the drug is considered to be twice as toxic as procaine, and dosages larger than 0.5 g. should not be used when the recommended 0.5 to 2 per cent. concentrations are employed for injection. It is a suitable substitute for procaine and its derivatives when true allergic reactions to the latter have been demonstrated.

Mepivicaine hydrochloride is the most recently synthesized non-ester local anæsthetic compound. It is an amide with the amide radical linked to a saturated heterocyclic ring of the piperidine group. In comparison with lignocaine, mepivicaine acts equally quickly but increases the duration of anæsthesia by approximately 20 per cent. The concentrations used range from 0.5 to 4 per cent. for injection or topical anæsthesia. The reactions reported thus far have been few. Although tissue irritation is absent, the effects on neural tissues have not been studied and the drug is not recommended for use in spinal anæsthesia.

As an aid to the reader, and with a view toward prevention of reactions, table I lists the local anæsthetics discussed in this article, their nomenclature, chief usage, suggested concentrations and safe dosage limits.

LONG-ACTING LOCAL ANÆSTHETICS

There is a real need in the treatment of postoperative pain and in the management of intractable pain for local anæsthetics with a duration of action longer than six to eight hours, the maximum obtainable with currently available substances. In viewing this problem one must bear in mind the definition of local anæsthesia as being a reversible and non-destructive process. The long-lasting effects of certain compounds described in many reports do not represent true anæsthesia. Careful histological examination after the experimental injection of these compounds has revealed destruction of nerve fibres.

Solutions of local anæsthetics in oil have been thought to act as repositories from which the anæsthetic is gradually released, thereby prolonging the effect. Prolongation of anæsthesia, however, has never been demonstrated

by such means. In some cases the oily base has remained at the site of injection, to act as a focus for abscess or granuloma formation. Proprietary long-acting anæsthetic mixtures often contain benzyl alcohol, eugenol, bromsalizol, saligenin or phenol. These alcohols should not be classified

Drug	Topical use	Maximal dose (mg.)	Injection	Maximal dose (mg.)
Cocaine hydrochloride	Respiratory tract: 5 to 10% (4 to 2 ml.)	200	Not employed	—
Procaine hydrochloride	Ineffective	—	Infiltration: 0.5% (200 ml.) Peripheral nerves: 1 to 2% (100 to 50 ml.)	1000
Chloroprocaine hydrochloride	Ineffective	—	Infiltration: 0.5% (200 ml.) Peripheral nerves: 2% (50 ml.)	1000
Piperocaine hydrochloride	Infrequently used Urethra: 2% (30 ml.)	600	Infiltration: 0.5% (200 ml.) Peripheral nerves: 1 to 1.5% (100 to 65 ml.)	1000
Hexylcaine hydrochloride	Respiratory tract: 5% (5 ml.)	250	Infiltration: 0.5% (100 ml.) Peripheral nerves: 1 to 2% (50 to 25 ml.)	500
Amethocaine	Respiratory tract: 1 to 2% (8 to 4 ml.)	80	Infrequently used for infiltration and nerve injection: 0.1 to 0.25%	200
Cinchocaine	Infrequently used: 0.2% (15 ml.)	40	Infrequently used	—
Lignocaine	Respiratory tract: 2 to 4% (10 to 5 ml.)	200	Infiltration: 0.5% (100 ml.) Peripheral nerves: (1 to 2% (50 to 25 ml.)	500
Mepivicaine hydrochloride	No data	—	Infiltration: 0.5 to 4% (100 to 50 ml.) Peripheral nerves: 1 to 2%	500

TABLE I.—Suggested uses, concentrations and maximal dosages of the local anæsthetics discussed in this article. Employment of local anæsthetics for specialized techniques is not indicated.

as local anæsthetics, for they are destructive to nervous tissues. Fortunately, such mixtures are usually employed to relieve pain after ano-rectal surgery or episiotomy in areas of the body where neurological deficit is of little consequence. One must be certain never to inject these solutions about

the larger peripheral nerves or in the vicinity of the spinal cord, for the neuritis produced may lead to pain worse than that originally experienced, or to the complication of transverse myelitis.

REACTIONS TO LOCAL ANÆSTHETICS

Untoward reactions to local anæsthetics may be due to absorption of the anæsthetic into the circulation with production of systemic effects, to local tissue destruction, or to a true allergy. Reactions are often erroneously ascribed to sensitivity or idiosyncrasy whereas they can logically be explained on recognized pharmacological grounds even though exceedingly small doses may have been responsible for the effects observed.

Systemic reactions.—Systemic reactions are those most commonly encountered, with symptoms referable to the central nervous, respiratory, or cardiovascular system. They result from the absorption into the blood stream of quantities of drug which, in the central nervous system, excite the cortex to the point of convulsion or produce drowsiness and unconsciousness. The depressant effect on the medullary centres can lead to apnœa and vascular collapse. It is not generally appreciated that local anæsthetics may depress the myocardium directly by reason of their quinidine-like effect on conduction contractility and irritability. For this reason procaine and lignocaine have been employed as anti-arrhythmic agents. The effect on the myocardium, leading to hypotension or cardiac standstill, is enhanced by the peripheral vasodilator actions of these drugs. It must be emphasized that all these untoward effects can occur rapidly in response to the injection of much less than the expected toxic doses and in some cases to exceedingly small quantities. The most feared outcome is sudden, simultaneous respiratory and cardiac arrest.

Since the circulating blood level of anæsthetic is the prime factor in the production of systemic reactions the area of injection is important in a consideration of the rapidity of absorption. The intravenous route is the most dangerous, but absorption from the pharyngeal, tracheal and bronchial mucosa produces high blood concentrations almost as rapidly. The reason for this is the dense vascularity of these areas, the rapid absorption from the lungs and the direct circulation of drug to the myocardium, where a depressant effect may be produced. Thus, it is not surprising that most reported cases of sudden cardiovascular collapse have involved the topical application of anæsthetics to the respiratory tract. Other hazardous injection sites, because of greater vascularity, are the tissues of the head and neck and the perivertebral region. Least dangerous are the subcutaneous tissues of the trunk and limbs. Hyaluronidase, by reason of its spreading action, was once added to local anæsthetic solutions to increase the percentage of successful nerve injections, but the number of systemic reactions was increased, undoubtedly because of more rapid absorption of the anæsthetic. It is of interest that anæsthetic solutions taken into the œsophagus and

stomach produce few reactions, probably because of absorption into the portal venous system and rapid metabolism in the liver.

A second factor of importance in the causation of reactions is the rapidity of hydrolysis or destruction once an anæsthetic reaches the circulation. The enzymes that produce hydrolysis are the pseudocholinesterases formed in the liver. Hydrolysis of the ester compounds proceeds at varying rates, and toxicity has been related quantitatively to this factor alone. The generalization may therefore be made that ester compounds are likely to be less toxic than substances such as cinchocaine, lignocaine and mepivicaine that are metabolized by other means.

PREVENTION OF SYSTEMIC REACTIONS

Total quantity of anæsthetic.—In view of the causative factors noted, the least quantity of anæsthetic must be utilized for a procedure. The total amount of drug injected is more important than the concentration or volume. One should employ the minimal effective concentration and the smallest volume, bearing in mind that sensory nerve impulses are blocked by the least concentrations.

Use of adrenaline.—As a secondary measure the rate of absorption should be retarded as much as possible. This can be accomplished to some extent by slow injection and repeated aspiration for blood, particularly in vascular areas, to avoid intravenous injection. The vasoconstrictive property of adrenaline, added to the anæsthetic solution, however, provides greater assurance against rapid absorption. Additional benefits are the prolongation of anæsthesia and decreased bleeding, both the result of vasoconstriction. Peak prolongation of anæsthesia and probable maximal protection against absorption is achieved with the employment of 1:100,000 concentrations of adrenaline or 1 mg. per 100 ml. of solution. Almost identical effects, however, can be obtained with 1:200,000 or 1:300,000 concentrations, 0.5 and 0.3 mg. of epinephrine per 100 ml. respectively. These quantities should be measured with a calibrated syringe rather than added to the anæsthetic solution according to the number of drops—a grossly inaccurate method.

Only the most effective concentrations of adrenaline should be employed for local anæsthesia since the drug may prove to be toxic in its own right. Indeed, many reported reactions to local anæsthetics resemble the pharmacological effects of adrenaline in the form of nervous apprehension, body tremors, skin pallor, sweating, and palpitation. This drug is dangerous to use in the patient with myocardial disease or coronary sclerosis because of the stimulation and increased work demanded of the heart. Local injection of anæsthetic solutions containing adrenaline has produced gangrene of the digits, usually when a tourniquet has been used. Little benefit in decreasing absorption is derived from the addition of adrenaline to solutions of topical anæsthetic applied to the tracheo-bronchial tree. The employment of noradrenaline, which lacks some of the undesirable cardiac effects of adrenaline,

has been suggested to provide vasoconstriction, but the possibility of producing tissue slough at the injection site has limited its use.

Barbiturates and central stimulation.—The pre-anæsthetic administration of a short-acting barbiturate, quinalbarbitone or pentobarbitone, in sedative doses, is generally believed to protect against the central stimulating or convulsive properties of the local anæsthetics, but the small quantities of barbiturate employed provide little more than relief from apprehension. Experimental evidence suggests that full narcotic, rather than sedative, doses of the barbiturate are required to prevent convulsions. This, however, is not meant to imply that these drugs should not be used in the treatment of this type of reaction.

TREATMENT OF SYSTEMIC REACTIONS

The rapid intravenous injection of a short-acting barbiturate is the treatment of choice for incipient or fully developed convulsions. The intramuscular route may be used if necessary but is less effective in rapidly depressing the cortical stimulation caused by the local anæsthetic. For these purposes the physician should keep on hand quinalbarbitone or pentobarbitone in single-dose ampoules or multiple-dose vials. The hazards of a convulsion are production of cerebral hypoxia, likelihood of bodily injury, possibility of aspiration of vomitus and, in some cases, post-ictal respiratory and circulatory arrest following upon the anoxia. Consequently, if oxygen is at hand this should be given by inhalation simultaneously with the injection of a barbiturate.

Circulatory depression, as indicated by hypotension or a weak pulse, should be treated with vasopressor drugs given intravenously or intramuscularly as the urgency warrants. For this purpose single-dose ampoules of ephedrine or phenylephrine must be at hand. It matters little which vasopressor is given in an emergency so long as myocardial depression and peripheral vasodilatation are reversed before cardiac standstill ensues. If cardiac arrest is suspected rhythmic, forceful compression of the sternum may act as a fairly effective substitute for the more hazardous procedure of thoracotomy and direct manual systole of the heart; thoracotomy is not advisable unless there is a reasonable chance of managing the open chest with the help of experienced persons.

The treatment of cardiovascular and respiratory depression requires a knowledge of the elementary principles of resuscitation. Although it may be too much to expect every physician to equip himself with respiratory resuscitative devices, everyone should know how to perform mouth-to-mouth breathing. In any type of artificial pulmonary ventilation the maintenance of a patent pharyngeal airway is essential. Of the many resuscitative efforts witnessed the simple measure of providing unobstructed pulmonary ventilation, even if performed only with atmospheric or expired air, has often been sufficient to avert or reverse apparent cardiac arrest.

LOCAL IRRITATION AND TISSUE DESTRUCTION

In the past a number of local anæsthetic substances has been introduced to clinical practice before appropriate tests were made to detect tissue destructive properties as described in the paragraph on long-acting local anæsthesia (p. 638). It is not enough merely to report absence of an inflammatory response in animal tissues; previously untried anæsthetics must be injected into nerves to detect neurolysis and neuronal destruction. If this procedure had been followed a number of cases of peripheral neuritis or transverse myelitis consequent on injection of destructive compounds might have been prevented. The anæsthetics mentioned in this article are safe from this standpoint.

A sensitive technique has recently been described to detect tissue damage by the injection of local anæsthetics into the anterior chamber of the rabbit's eye. Irritation is indicated by the development of corneal opacity. Still another method has been the observance of the effect of local anæsthetics on ciliary activity in biopsied human bronchial ciliated epithelium. Toxic properties are suggested if the paralyzing effect on ciliary movement is not reversible.

With the latter technique, procaine, lignocaine and cocaine revealed minimal toxic effects at clinically useful concentrations. Amethocaine and cinchocaine proved to be considerably more toxic in the same circumstances.

ALLERGIC REACTIONS

True allergic reactions to the local anæsthetics of an antigen-antibody nature have been reported infrequently.

We have observed a reaction resembling anaphylaxis in a patient with a history of multiple allergies in whom bronchospasm and near cardiac standstill rapidly developed after topical application of cocaine and injection of procaine for tonsillectomy.

Dermatitis after repeated exposure to local anæsthetics occurs not uncommonly and, as expected, in professional personnel. Cross-sensitivity develops to compounds of like chemical constitution. When sensitivity has been demonstrated further use of local anæsthetics requires the substitution of a compound of an entirely different chemical nature.

PRACTICAL SUGGESTIONS FOR THE USE OF LOCAL ANÆSTHETICS

Local anæsthesia is a valuable therapeutic measure that can be safely applied. Certain practical manœuvres are necessary for uniform success. For example, useful information may be gained by reading one of the textbooks devoted to nerve blocks each time a new procedure is contemplated. Usually, only a page or two need be perused to discover the most economical technique from the standpoint of anæsthetic dosage to render a particular area of the body insensitive to pain.

A patient scheduled for nerve block should refrain from eating or should take an easily digestible meal at least four hours before the procedure, to

forestall vomiting. This may occur as a psychogenic response or may accompany a systemic reaction to the local anæsthetic. A sedative dose of one of the short-acting barbiturates may be prescribed to allay apprehension. If ambulatory, the patient should be accompanied by a relative or friend and should not be permitted to drive a car after taking a sedative. Every patient should be questioned for previous untoward reactions to the local anæsthetics, and his general physical condition should be known.

The patient should be recumbent at the time of injection, and the skin prepared with an antiseptic that will not stain clothing or bed garments. Although freshly prepared solutions of local anæsthetic are the most reliable, the physician will do best to employ already sterilized single-dose ampoules of drugs prepared by reputable manufacturers. The quantity of anæsthetic to be injected should be calculated in advance, keeping well below the suggested toxic dose. As already noted, this can be achieved by selecting the minimal effective concentration necessary for nerve-impulse interruption, understanding the anatomical course of nerves and injecting at a point where maximal effect will be obtained with the least quantity of solution. The discriminating use of adrenaline has already been discussed. A common mistake is not to wait long enough for the anæsthetic to take effect or to inject only the subcutaneous tissues, thereby missing the intracutaneous nerves. Injection must be unhurried and gently performed, with frequent aspiration for blood and constant observation of the patient. Observation of the face may disclose the muscular twitches that herald a more generalized reaction. Continuous conversation serves to reassure the patient and to detect in his replies garrulousness, excitement, or loss of consciousness.

Upon completion of a procedure performed under local anæsthesia, particularly a complicated one, the patient should be observed for some time, to detect delayed complications. This is a matter of the physician's knowledge and judgment. If a reaction to the anæsthetic has been observed the patient must be fully informed so that a repetition in other hands may be avoided. Finally, a record of the procedure must be kept as a protection to both patient and physician.

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CALLING THE LABORATORY

XVII.—TESTS FOR THYROID ACTIVITY

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THE various tests available for estimating thyroid activity fall into three main categories. (i) Thyroid function may be assessed by means of radioactive iodine (I^{131}). (ii) The level of thyroid hormone in the blood may be obtained from a chemical estimation of the protein-bound iodine (P.B.I.) in the plasma; the *in vitro* uptake of labelled triiodothyronine by red cells, a test which has been developed recently, may be considered as an indirect method of measuring the P.B.I. (iii) Estimation of the basal metabolic rate (B.M.R.), for long the standard laboratory method of assessing thyroid activity, is still a useful test provided the technique and standards advocated by Robertson and Reid (1952) are used.

RADIOACTIVE IODINE TESTS

I^{131} tests are very efficient in detecting hyperthyroidism: they are less reliable in hypothyroidism. The tests, of which a great variety have been described, all depend fundamentally on measurement of either the rate of accumulation of I^{131} by the thyroid or the rate at which the gland discharges labelled hormone into the circulation. The rate of accumulation may be measured directly by an *in vivo* method or indirectly by measuring the amount of I^{131} excreted in the urine.

(a) *Thyroid uptake tests.*—Thyroid uptake may be measured at any specified time after the test dose of I^{131}. For technical reasons, however, it is difficult to make an accurate estimation of the amount of I^{131} in the thyroid on the basis of a single measurement. The rate of uptake, especially when this is measured during the early phase, gives a much more reliable indication of the avidity of the thyroid for iodine. The dose has to be given intravenously for this type of test, but if measurements are made after the first hour it may be given by mouth. The short-lived isotope of iodine, I^{132} (half-life, 2.3 hours), is sometimes used for early uptake tests, and has the advantage that the radiation dose to the gland is substantially less than that from I^{131}. Thyroid uptake is often measured at twenty-four hours but comparison with other I^{131} tests has shown the twenty-four-hour uptake to be less discriminating than other methods.

(b) *Urinary excretion tests.*—Urinary excretion tests are sometimes preferred to *in vivo* tests of thyroid uptake on technical grounds since the radioactivity in a sample of urine can be accurately determined. Excretion tests have certain disadvantages: they are less convenient for the patient and the

results have to be discarded sometimes because of incomplete collection of urine. On the other hand they provide a useful diagnostic test throughout the whole range of thyroid function, and in the diagnosis of hypothyroidism they are more reliable than other I^{131} tests, early thyroid uptake tests being of little value in this respect. Excretion tests are usually based on the collection of urine over selected intervals, from which an index of thyroid function may be derived.

(c) *Organic radioiodine tests.*—I^{131} which has been accumulated by the thyroid becomes synthesized into thyroid hormone and reappears in the circulation bound to protein. Most of the protein-bound iodine consists of thyroxine. The rate at which labelled hormone appears in the circulation depends on the rate of turnover of iodine in the thyroid. Hence the level of protein-bound I^{131} (P.B.I^{131}) in the plasma at a given time will be a measure of thyroid function. The estimation is usually done at forty-eight hours. The P.B.I^{131} level in the plasma is influenced by various other factors, the most important of these being the amount of organic iodine in the thyroid. The organic iodine content of the thyroid, which evidently depends partly on the amount of thyroid tissue present, may be considerably reduced in patients treated for thyrotoxicosis by surgery or by I^{131}. In these circumstances labelled hormone may appear rapidly in the plasma, despite a normal level of stable hormone in the blood, so that P.B.I^{131} values may be abnormally high in patients who are in fact euthyroid. For detecting hyperthyroidism in patients who have not received any treatment P.B.I^{131} tests are as efficient as, possibly more so than, any of the other I^{131} tests in current use. They have not been found to be of any value in the diagnosis of hypothyroidism.

The results of I^{131} tests may occasionally be misleading unless the various factors which may influence or modify thyroid function are recognized. The thyroid responds to iodine deficiency by increasing the efficiency of the mechanism whereby it extracts iodine from the circulation. About 10 to 20 per cent. of patients with non-toxic goitre behave, so far as the metabolism of iodine is concerned, as if they were suffering from iodine deficiency: uptake tests show an increased avidity for I^{131}, but this is not accompanied by the increase in iodine turnover in the thyroid, characteristic of thyrotoxicosis, the P.B.I^{131} value being low or within normal limits. It is essential to combine one of the tests which measure I^{131} accumulation with a P.B.I^{131} estimation in this group of patients in order to avoid making an erroneous diagnosis of thyrotoxicosis. I^{131} tests are also liable to be misleading in patients who have been taking antithyroid drugs, thyroid hormone or iodine-containing compounds.

CHEMICAL ESTIMATION OF PROTEIN-BOUND IODINE

Chemical estimation of the level of P.B.I. in the plasma may be regarded as giving the best indication of the activity of the thyroid gland, since it is a direct measure of the concentration of thyroid hormone in the blood. The

normal range is usually between 3.5 and 7.5 microgram per 100 ml. of plasma. The assay is beset by technical difficulties. The amount of iodine being estimated is extremely small and contamination of glassware can easily invalidate the results. The accuracy of the method is affected by iodine medication in any form, and other factors such as the administration of mercurial compounds can also affect the results. Relatively few laboratories are able to guarantee reliable results with this assay, but where suitable facilities do exist it has proved an extremely useful test. It is effective throughout the whole range of thyroid function, but is of particular value in hypothyroidism, where other tests are usually less discriminating.

On account of the difficulties involved, a P.B.I. estimation is not recommended as a routine laboratory method for assessing thyroid activity. It is best reserved for patients who cannot be assessed readily on the basis of other tests, as for instance after thyroid surgery or treatment with I^{131}; or in cases in which the results of other tests are equivocal.

THE IN VITRO UPTAKE OF LABELLED TRIIODOTHYRONINE BY RED CELLS

This test is comparatively simple to perform. Labelled triiodothyronine is added to whole blood and incubated at 37° C. for one to two hours. The red cells are then washed with saline and the proportion of the radioactivity in the red cells determined, a correction being made for the hæmatocrit value. The uptake is increased in thyrotoxicosis and reduced in hypothyroidism. Experience has shown this test to be useful, particularly in the diagnosis of hypothyroidism, although it does not perhaps provide such a clear-cut separation of clinical states as was originally claimed. The uptake of labelled triiodothyronine by red cells is abnormal in certain other conditions, notably in pregnancy, nephrosis and liver disease.

A rational basis for the test is provided by considering the relationship between the thyroid hormones and the plasma proteins. Most of the thyroxine in the blood appears to be bound to a specific thyroxine-binding protein (T.B.P.) which also has an affinity for triiodothyronine. T.B.P. is not saturated with thyroxine under normal conditions, although it may become so if the thyroxine concentration in the plasma is sufficiently high. When triiodothyronine is added to blood it will be distributed between the red cells and the plasma proteins, including T.B.P. The proportion of triiodothyronine which will be available for the red cells will depend largely on the extent to which T.B.P. is saturated with thyroxine. When a large proportion of the binding sites on T.B.P. are occupied by thyroxine, there will be more triiodothyronine available for the red cells. When the thyroxine concentration in the plasma is low more triiodothyronine will be accommodated on the larger number of free binding sites on T.B.P. and there will be correspondingly less available for the red cells. Thus the uptake of labelled triiodothyronine by the red cells is an indirect method of measuring the concentration of thyroxine in the plasma.

In this account the role of the plasma proteins in the binding of thyroid hormones has been greatly over-simplified in order to provide an intelligible explanation of the test in the limited space available.

BASAL METABOLIC RATE

The basal metabolic rate (B.M.R.) is usually measured by a closed-circuit method, using the Benedict-Roth apparatus. Duplicate estimations should be performed on two consecutive days, and the results should not be accepted unless they are well within 10 per cent. of each other. Alternatively, the B.M.R. may be measured by means of a diaferometer. This is an open-circuit method in which the patient breathes room air, the B.M.R. being calculated from the differences in O_2 and CO_2 tension in room air as compared with expired air: it may be better suited to some subjects who may have difficulty in using the standard B.M.R. apparatus.

The B.M.R. is the only test that gives some indication of the severity of the disease. There are, however, numerous other conditions including congestive cardiac failure, in which hypermetabolism occurs. One of the difficulties of interpreting the results of B.M.R. estimations is due to the considerable variation in the normal range. Thus, in a case of mild thyrotoxicosis the B.M.R. may be within the normal range although increased for the particular individual concerned. In such an individual a significant fall in the B.M.R. will take place if specific treatment is given. B.M.R. estimations also tend to be unreliable in obese patients: depot fat has a very low rate of oxygen utilization, and the surface area in an obese person is not therefore a suitable reference standard for oxygen consumption.

SERUM CHOLESTEROL

The serum cholesterol is only indirectly a test of thyroid activity, but a raised serum cholesterol is found in a high proportion of patients with hypothyroidism. It is often helpful as an ancillary test in this condition, but is of no diagnostic value in thyrotoxicosis.

CONCLUSIONS

In the diagnosis of thyrotoxicosis I^{131} tests have proved more reliable than other tests, particularly in detecting thyrocardiac disease which may be difficult to diagnose on clinical grounds. In hypothyroidism the diagnosis is preferably confirmed by two or more laboratory tests: a B.M.R., I^{131} excretion test and serum cholesterol are recommended. If it is thought to be inadvisable to give a patient a radioactive substance, the *in vitro* uptake of labelled triiodothyronine by red cells provides a useful alternative to conventional I^{131} tests. In doubtful cases of thyrotoxicosis or hypothyroidism the final diagnosis may be resolved by observing the response to specific treatment.

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PRINCIPLES OF REHABILITATION

V.—SOURCES OF HELP FOR HANDICAPPED PEOPLE

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Before the 1939-45 War, to a large extent help for the physically handicapped person was dependent on local goodwill and charity. The early post-war era, however, saw a miniature spate of legislation on the subject, as well as a considerable amount of reorganization and expansion of the voluntary bodies.

VOLUNTARY AND STATUTORY SOURCES

The principal legislative procedures after the war were: the National Insurance Act; the National Insurance (Industrial Injuries) Act; the Disabled Persons (Employment) Act; the National Health Service Act, and the National Assistance Act. These Acts have endowed many authorities with permissive powers to do as much or as little as they feel inclined for handicapped people. In Hampshire we are fortunate in having an excellent liaison with a progressive local authority and the fact that its powers are permissive in no way limits solving the relevant problems which occur. In other areas the permissive powers are indifferently or even parsimoniously indulged in, and the question inevitably arises as to whether it might not be better if these powers were made obligatory.

In the main, most of the requisite help is obtained from authorities under the Ministry of Health or under the Ministry of Labour. Probably the most useful person for every practitioner is the social worker who in most cases is the trained hospital almoner and who has a lot of useful information readily available.

Of the non-statutory or voluntary authorities, probably the best known are the Order of St. John and the British Red Cross Society, and the Central Council for the Care of Cripples. After these come more specialized societies which deal with, for instance, rheumatism, multiple sclerosis, poliomyelitis, and spastics.

AT HOME

The presentation of a hypothetical case of a handicapped child will probably serve best to illustrate how these various authorities can be employed. Take, for example, a child aged three who is severely crippled with poliomyelitis, to the extent of not being able to walk. Initially, the diagnosis will be made by the family doctor, the case notified to the medical officer of health, and the child admitted to one of the hospitals in the appropriate regional board. At this stage, after the initial illness has subsided, the main problem of restoration of function will be the hospital's responsibility. This will involve, in the main, physiotherapy to build up all the muscles

which have an attacked nerve supply, and the provision of instruments—e.g. calipers, wheel-chairs—to aid locomotion. Subsequently, modification to the house will be organized by means of help from the welfare authorities who can do an almost limitless variety of tasks; in many cases this will include a ramp from the garden into the house; downstairs lavatory and bath accommodation, and, if necessary, a hoist and slings; and other structural alterations such as widening doors. These facilities are permissive by the local authorities under Section 29 of the National Assistance Act. If, however, a certain amount of sickroom equipment is required, this will be supplied under the permissive powers granted to the county medical officer or the county borough medical officer under Section 28 of the National Health Act. Naturally there is some overlap but this in practice is not serious. Speaking generally, the welfare authorities are usually responsible for a handicapped person with fixed disabilities not involving nursing procedures, whereas the Health Service is responsible for other cases.

AT SCHOOL

As the time approaches when the education of the child will have to be considered, and of course when possible every step should be taken to have the child educated in as normal surroundings as possible, the correct procedure is to approach the medical officer of health, who will contact the education authorities. In Hampshire we have always had sympathetic help from the education authority. As a result many children in wheel-chairs attend the normal schools and benefit considerably by growing up among normal people.

GAINFUL EMPLOYMENT

When the child enters his or her 'teens', consideration will then have to be given to the future job at which he or she will be gainfully employed. In the hypothetical case which we are considering this will involve a ground-floor sedentary occupation and the education programme will be selected with this in view. When the child is within a year of leaving school, contact is made with the Ministry of Labour who have appointed youth employment officers to deal with the situation at this stage. When the time comes to leave school, the child will be registered as a disabled person and will then either proceed into gainful employment or may be sent to a centre for more specialized training: for example to St. Loyes Residential School at Exeter, or to Queen Elizabeth's Training College at Leatherhead, to mention but two. After the age of eighteen the work of the youth employment officer is taken over by the district resettlement officer.

In addition, any necessary adjustment, financial or otherwise, to the social background will be implemented, in the first place, through the social worker.

Although I have restricted this brief review to the problem of the physically handicapped it should be borne in mind that the facilities described are equally well organized for the blind, deaf and the dumb, and other handicapped sections of the community.

REVISION CORNER

TOXOPLASMOSIS

If a prize were offered for the most successful parasitic protozoon, *Toxoplasma gondii*, that 'petit banan', would be well in the running. It is found everywhere, infects many (probably all) species of warm-blooded animals, can live in any nucleated cell, may persist for the lifetime of its host; and rarely does any harm. On the basis of antibody surveys, it is estimated that by adult life from a quarter to a half of the population of England has been infected. How it spreads is unknown: paradoxically perhaps, just because there are so many possibilities. It may come from any animal, including man, be spread in any excretion or secretion and enter by any route. Perhaps, though this is no more than a guess, the most likely vehicle is sputum or saliva and the most likely portal, pharyngeal lymphoid tissue.

ACQUIRED TOXOPLASMOSIS

The commonest manifestation of acquired toxoplasmosis is lymphadenopathy, beginning in the neck and spreading to glands elsewhere. The severity varies from benign glandular swelling, unnoticed by the patient, but detected on routine examination, to a febrile illness with, in addition to glandular enlargement, weariness, weakness and pains in muscles and joints. Sometimes there is headache and hepato-splenomegaly and the illness may go on for months. The condition resembles infectious mononucleosis and may even show a similar blood picture, but there is no Paul-Bunnell reaction. Five to seven per cent. of cases of 'glandular fever' unaccompanied by this reaction prove to be toxoplasmosis (Beverley and Beattie, 1958).

Severe and fatal cases of acquired toxoplasmosis are uncommon. Myocarditis is usually present in association with other manifestations.

Hooper (1957), in reporting a fatal case of her own and reviewing 20 others, stated that toxoplasma was found in the heart muscle in 16 instances, and Potts and Williams (1956) recorded its isolation from the heart of an English patient.

It should, however, be remembered that toxoplasma has been found as an apparently harmless invader in the heart of persons who died of other causes (Kean and Grocott, 1947). Pericarditis has also been reported. Next to the heart in frequency of involvement come the lungs, toxoplasma being found in 5 of 21 fatal cases (Hooper, 1957). The pathological change has been described as interstitial pneumonitis (Pinkerton and Henderson, 1941). Pleurisy has occurred. Other manifestations have been meningo-encephalitis, myositis, skin rashes, hepatitis, splenitis, and nephritis. In contrast to congenital toxoplasmosis, eye lesions, though they occur, are rare.

CONGENITAL TOXOPLASMOSIS

Congenital toxoplasmosis, being more dramatic than the acquired form, is better known. It has been presumed that for it to occur the mother must

acquire infection, almost always subclinical, during pregnancy. The discovery, however, of toxoplasma apparently harmlessly present in the uteri of 3 non-pregnant women (Remington, Melton and Jacobs, 1961) has reopened the question of congenital transmission from a mother infected before pregnancy, the fœtus being, in the words of Weinman (1952) 'a non-immune intruder into an environment where a satisfactory balance has been established'. However this may be, there is no proven instance of more than one infected baby being born of any one mother (Feldman and Miller, 1956). Various estimates have been made of the incidence of congenital toxoplasmosis. A careful investigation by the Holmdahls (1955) put it at 1 to 2 per 10,000 births in the city of Gothenburg. They were concerned only with obvious clinical illness and their estimate does not necessarily hold for other places.

Congenital infection (as also acquired infection) is at first generalized. Healing can take place *in utero*. It has been suggested (Frenkel and Friedlander, 1951) that the manifestations which the baby presents at birth depend upon the time of infection. If this has been late in pregnancy, hepato-splenomegaly, jaundice, pneumonia, myocarditis, encephalitis and skin rashes may predominate. The appearance may resemble hæmolytic disease of the newborn or there may be neonatal purpura. If infection has taken place earlier, there may have been time for the visceral manifestations to heal and the child be left with some or all of Sabin's (1942) tetrad: choroido-retinitis, intracerebral calcification, internal hydrocephalus (often found in the presence of microcephaly) and fits, or other signs of involvement of the central nervous system.

Toxoplasmosis of the eye.—Choroido-retinitis is the most constant manifestation of congenital toxoplasmosis. It may be the only one and escape notice till the child begins to read, or even till adult life. Between 25 and 35 per cent. of choroido-retinitis is considered to be of toxoplasmic origin, mostly congenital, although it may rarely follow an acquired infection (Perkins *et al.*, 1956).

LABORATORY DIAGNOSIS

As there is nothing very characteristic in the signs and symptoms, laboratory diagnosis is important. Most reliable is the isolation of the parasite.

This may be done by inoculating mice or hamsters with blood, cerebrospinal (or, better, ventricular) fluid or biopsy material from gland or muscle. After death any tissue may be used. Next comes the demonstration of toxoplasma in histological sections, impression smears or body fluids. It is, however, hard to find and the proliferative form is not easy to identify. (The finding of toxoplasma in tissue does not necessarily mean that it is the cause of the patient's illness.)

Most commonly diagnosis is based on the results of serological tests. In England and Wales these are done by the Public Health Laboratory Service, which employs two tests, a complement fixation test of the usual type and the dye test of Sabin and Feldman (1948).

This depends on the observation that when toxoplasmata are mixed with serum containing antibody in the presence of fresh human serum free of antibody they lose their capacity to be stained by methylene blue. Other tests less commonly

used are the direct agglutination test (Fulton and Turk, 1958) and the hæmagglutination test (Jacobs and Lunde, 1957; Lunde and Jacobs, 1959).

The interpretation of these antibody tests is complicated by the prevalence in the general population of antibodies due to subclinical infection. A safe criterion is that of Sabin and his colleagues (1952) that the dye test titre should increase eightfold or more to at least 1 : 256 and be maintained at that level for several weeks. During this time the complement-fixing antibody titre should either change from negative to positive and rise to a titre of 1 : 8, or, if positive initially, should subsequently increase at least fourfold. Often, however, the possibility of toxoplasmosis is not considered until antibodies have reached their peak: this happens from one to three months after infection (Beattie, 1958). Then all that can be done is to assess

Titres	1:4	1:8	1:16	1:32	1:64	1:128	1:256
Positive	50%	40%	25%	15%	7%	2%	0.2%

TABLE I.—Toxoplasma dye-test antibody titres in general adult population.

the probabilities. To do this it is necessary to know the levels of antibody found in the general population. Amongst adults in Sheffield and Lincolnshire this is as shown in table I (Beattie, 1958). In children antibodies are said to be less commonly found and, when they are, to be of higher titre (Feldman and Miller, 1956).

Fortunately, in cases of recent infection there is, as a rule, little difficulty. Provided sufficient time has elapsed since the onset, antibody will be found in excess of titres found in the general population. In the diagnosis of congenital infection it must be remembered that antibody is passively transferred from the mother. If at birth the dye test antibody titres of mother's and baby's sera are in the thousands the likelihood of congenital toxoplasmosis is strong. If they are less, it will be necessary to make repeated tests, including tests on the serum of the baby after the age of six months, to see whether he is actively producing antibody. Where the greatest difficulty arises is in the diagnosis of chronic illness, most commonly ophthalmic, arising from congenital infection in the distant past. In such cases antibodies will have fallen to levels commonly found in the general population and diagnosis in the individual case will rarely be possible.

TREATMENT

Since the effects of toxoplasma infection may be serious any illness due to it should be treated. Animal experiments have shown the most effective treatment to be a combination of pyrimethamine and sulphonamide (Eyles, 1956; Beverley, 1958). There are several reports of success with this in the treatment of human patients (Kayhoe *et al.*, 1957; Wettingfield *et al.*, 1956). As toxoplasma is an intracellular parasite prolonged treatment would seem to be required, as in tuberculosis. Pyrimethamine is toxic and the blood picture should be watched. The simultaneous administration of folinic acid

neutralizes the toxic effects (Frenkel and Hitchings, 1957; Frenkel and Jacobs, 1958; Frenkel *et al.*, 1960). Since allergy may play a part in recurrences of choroido-retinitis a steroid should also be given in this condition.

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NOTES AND QUERIES

Prolonged Œstrogen Treatment

QUERY.—Following hysterectomy with removal of the ovaries at the age of 46, a patient suffered menopausal flushes which I relieved for a time with œstrogens. Thereafter I did not see her for a while, and, unbeknown to me, she continued to purchase for herself œstrogens from a chemist, which she took for some three years without intermission until I discovered what she was doing. I have advised her to leave these off.

Is there any danger of carcinogenesis if œstrogens are continued in such a case? In particular, would it be justifiable to use a preparation such as 'tace' (chlorotrianisene)?

REPLY.—There is no evidence that carcinoma has ever been produced in human beings by the administration of œstrogens. Œstrogen therapy given for menopausal flushes tends to prolong these symptoms and is therefore best avoided when possible. A better treatment is to give small doses of sedatives if the flushes become very troublesome. This will not interfere with the length of the period when the readjustment of the body to the conditions of the menopause is complete. There is no advantage in chlorotrianisene, which is only a form of œstrogen.

W. R. WINTERTON, F.R.C.S., F.R.C.O.G.

Breast Secretion

QUERY.—One of my female patients, aged 24, has been married for eighteen months. Her periods are irregular, occurring any time between four and six weeks and they last about six days. She is quite healthy and normal, except that ever since she started menstruating she has had a milky discharge from her nipples. What is the explanation of this, and can anything be done about it? Will having a child improve the condition?

REPLY.—There is no relationship between menstrual irregularity of the type mentioned in the query and breast secretion. The usual explanation of a milky discharge from the nipple in the non-pregnant breast is massage of the breast. Many women these days palpate their breasts periodically searching for lumps, and if palpation is frequent or prolonged it can result in the expression of fluid from the nipple. In such cases the obvious remedy is to advise against frequent palpations or massage. Bearing a child will not of itself cure the condition because it is easier to express fluid from the breast of a woman who has borne a child, particularly if she has breast fed it, than it is from the breast of a virgin. Nonetheless, if there has been anxiety over the state of the breasts it could well happen that the arrival of a baby and successful breast feeding would relieve a woman of anxieties she might previously have experienced and in this way make it easier for her to give up her previous habit of breast massage.

J. A. STALLWORTHY, M.B., F.R.C.S., F.R.C.O.G.

Catgut for Perineal Repair

QUERY.—What is the proper catgut to use in perineal repair immediately after labour? Will either '20-day' or '40-day' catgut do?

REPLY.—'20-day' catgut is adequate for any perineal or vaginal repairs and even for Cæsarean section. There need be no anxiety about using it.

J. A. STALLWORTHY, M.B., F.R.C.S., F.R.C.O.G.

Chloroform in Domiciliary Midwifery

QUERY.—Is chloroform a safe anæsthetic to use in the obstetric procedures likely to be met with in general practice: i.e. application of forceps and manual removal of placenta?

REPLY.—Although chloroform is not considered to be as safe an anæsthetic as many currently used agents, nonetheless, in the presence of the explosion hazard, chloroform is conceded by many to be the anæsthetic of choice for domiciliary obstetrics. It should be remembered, however, that many domiciliary forceps deliveries can be performed satisfactorily under pudendal block analgesia, a technique which requires minimal equipment.

ALEX. C. FORRESTER, M.B., CH.B., F.R.F.P.S., F.F.A.R.C.S.

Renal Glycosuria and Pruritus Vulvæ

QUERY.—In a multiparous-3 patient renal glycosuria, associated with a slight monilial infection, is causing, or appears to be causing, the most distressing symptoms: pruritus vulvæ and local pain. In addition to local treatment of the moniliasis is it feasible to treat the renal glycosuria? If treatment is advisable, would it be possible, in addition to carbohydrate restriction, to use an oral hypoglycæmic agent? The duration of pregnancy is 24 to 26 weeks.

REPLY.—Pruritus vulvæ is a very rare symptom in renal glycosuria although it does occasionally occur. Provided that the moniliasis is being sufficiently treated with nystatin, and it is quite certain from a blood-sugar curve that the glycosuria is due only to a lowered renal threshold and that the blood sugar is not significantly raised, then it would be worth trying this patient on some local preparation such as 'ultracortenol' or possibly one of the barrier creams such as 'silicone vasogen'. I would not personally advise the use of an oral hypoglycæmic agent unless there was some definite indication apart from the pruritus vulvæ.

WILFRID OAKLEY, M.D., F.R.C.P.

Sun Sensitivity

QUERY.—Every year when the sun first comes out and it gets hot, a patient of mine, a boy aged about 14, gets an acute burning irritation of his exposed parts; with continued sunshine he becomes acclimatized to it. On examination there is nothing to see, no erythema, no rash and, in fact, although he complains of burning, his hands feel cold. Antihistamines and sedatives do not relieve him, and the only thing that helps is continued douching with cold water.

I have never come across anything like this before. Is this a well-known syndrome? Is there anything that can be done about it?

REPLY.—Protective measures adopted by the skin to resist the effect of sunlight are increased melanin pigmentation and a general thickening of the horny layer. In this case the boy appears to have a sun sensitivity but no abnormal sunlight eruption is produced. The history suggests that with continued sunlight his skin becomes acclimatized to it. He appears therefore to have

a normal reaction to sunlight, but is sensitive until his skin has undergone the protective response.

In the early stages the use of an antimalarial, such as hydroxychloroquine, 200 to 400 mg. a day, might give him a certain amount of protection but these drugs do not influence normal reactions of the skin to sun as sunburn. The skin could be exposed to minimal doses of ultraviolet light in the early part of the year to induce the normal protective changes of skin-thickening and pigmentation before the spring sunlight. Local application of a hydrocortisone spray might relieve his symptoms in the early stages and he could use a protective sun screen cream.

GEOFFREY HODGSON, M.B.E., M.D.

Impotency

QUERY (from a reader in Pakistan).—I have a patient who complains of impotency, and in spite of reassurance is gradually going into a state of depression. He is aged 30 years, unmarried, physically poor, of fair colouring, feminine build. Secondary sexual characteristics are well developed except: length of penis, 1½ x ½ inches (this is what worries him). Scrotal skin—thin. Testicular size ½ inch diameter. Left-sided varicose veins (which disappear after rest). Nocturnal emissions rare (perhaps once a month).

So far I have not given him any aphrodisiac or any hormonal treatment; I am only treating him psychologically. Please advise me what to do about him. He belongs to a good family. His three brothers and two sisters are normal, and his elder brother has two sons.

REPLY.—From the clinical description of the patient, it would appear that he is a eunuchoid. Theoretically, the best treatment would be with gonadotrophins. He could be given intramuscular injections of chorionic gonadotrophin in large doses—e.g. 3000 to 5000 i.u. thrice weekly. The signs of a successful response would be enlargement of the testes and penis, increase in libido with erections and emissions, and improvement in muscular strength and general outlook. With continued treatment (which may have to be prolonged over many months) fertile semen might be produced.

If, after a few weeks of the above treatment, no obvious response has appeared, it may be concluded that there is intrinsic testicular defect and gonadotrophin therapy should be abandoned. Testosterone should then be given, to produce its usual androgenic effects though, of course, the prospect of fertility would be negligible. It would be best to start with injections of a long-acting preparation—e.g. testosterone oenanthate, 250 mg. fortnightly—or by implanting eight 100-mg. pellets subcutaneously, repeating this at six-monthly intervals. Once a full response has been obtained, it may be possible to maintain a satisfactory status with oral therapy, e.g. fluoxymesterone, 5 mg. or so daily.

G. I. M. SWYER, D.M., M.D., M.R.C.P.

Ascariasis

QUERY (from a reader in Ceylon).—(a) In ascariasis what prevents the live roundworm from being digested in the gut? Is it the skin covering? If so, why is it that dead worms are sometimes passed out half-digested? Can it be that the live worm produces a secretion which inhibits the action of digestive enzymes?

(b) What piperazine preparation (hydrate, citrate, adipate) would you advise for routine use and in what dosage? Is it safe for use in children who are acutely ill? As ascariasis is endemic in Ceylon, I advise regular routine treatment to children in my practice, depending upon the number of worms expelled with treatment, i.e. once every two to six months. Is this safe and advisable? My results have been excellent. (Recently a two-year-old passed 640 worms within four days with a single dose of 1000 mg. of piperazine hydrate).

REPLY.—Professor W. L. M. Perry suggests that the reason why living gut epithelium is not digested is because the lipoprotein of living cell walls is not subject to enzymatic hydrolysis, but post-mortem this protection is lost. This may be associated with the active metabolism of living cells and the differential permeability actively maintained in life. Little is known about the physiology of helminths. Resistance of nematodes to the action of alimentary enzymes is ascribed to the chemical composition of cuticle, keratin and muco-proteids, which are very resistant to the action of proteolytic enzymes. Plant enzymes can digest the keratinous cuticle of the nematodes, after which both plant and alimentary enzymes continue the digestion of the internal structures of the parasite. That is why some of the plant proteolytic enzymes are used as anthelmintics, e.g. papain and ficin. The dead worms sometimes passed may have died of old age, been killed by plant proteolytic enzymes in the diet or been hurt somehow and then been attacked by alimentary enzymes. There seems to be circumstantial evidence that parasites in the intestine produce anti-enzymes which neutralize proteolytic enzymes. The isolation of some such substance is awaited.

The salts of piperazine in current use have no pharmacological difference. The hydrate is said to be less stable than the citrate. The elixir of the citrate is pleasant to taste, whilst the

tablets of adipate are easy to carry about. They are very safe, and side-effects are few. It is prudent to make sure that the patient's kidneys are working satisfactorily before giving piperazine. Dosage varies with the age and weight of the patient. The pharmaceutical manufacturers supply tables of doses for their products.

The day is awaited when no-one need be treated for worms until their presence has been proved and when hygiene has made that a rarity. Meantime, routine treatment is reasonably safe.

E. Ll. Lloyd, M.B., D.T.M. & H.

Intra-ocular Acrylic Lenses

Query.—What is the present position regarding intra-ocular lens implants following cataract extraction?

Reply.—Intra-ocular acrylic lenses, a British innovation, have now been in use for thirteen years. By replacing that portion of the optical system of the eye which required removal they restore far more natural sight than is provided by plain cataract extraction in conjunction with a powerful convex spectacle lens. On the other hand, a double operation involving first removal of defective tissue, followed by replacement by a prosthesis, is more complex than a simple extraction and special attention to surgical detail is necessary. Modern developments, particularly with two-stage technique, achieve an acceptable standard of reliability in the hands of surgeons who have special experience of the technique.

The principal indication for intra-ocular acrylic lenses is monocular cataract, due to trauma or other causes, for the absence of disparity in the size of the retinal images enables the two eyes to be used together and binocular vision to be restored. The extra complexity of intra-ocular lenses does not justify their use in cases of bilateral cataract, at least until more time has been allowed for the long-term results to be fully assessed. Many cataract patients, however, whose second eye became affected at a later date, now have two successful intra-ocular lenses and can see quite well without the aid of spectacles.

Harold Ridley, M.D., F.R.C.S.

Griseofulvin in Vitiligo

Query (from a reader in Tanganyika).—In view of the unsatisfactory results from the treatment of vitiligo, it is of interest that I have had a very satisfactory result in one case treated with griseofulvin, given orally: one tablet (250 mg.) three times a day for over a month; about 150 tablets were given in all. Is this merely coincidence?

Reply.—This is an interesting observation which one might be tempted to dismiss as a coincidence, since vitiligo does sometimes spontaneously get better. On the other hand, while I know of no reports of this sort in the literature, I have had one letter from Pakistan saying that a patient's finger-nails went dark grey while he was taking griseofulvin and resumed their normal pink when the drug was withheld. I myself have noticed a brownish-grey discoloration of a few patients' nails. There has been one report of hair darkening and another of skin doing the same, but no reports of using the drug specifically for vitiligo.

David I. Williams, M.B., F.R.C.P.

Foreign Bodies in the Nose

Dr. Sew Osterweil (Kfar Haroe, Israel) writes:—With reference to the article on 'Foreign Bodies in the Nose and Ear' (*The Practitioner*, December 1960, **185**, 817) I should like to report that during my experience as a country doctor for more than sixteen years I have found the best instrument for the extraction of foreign bodies from the nose to be a 'Knopf-sonde' of which one end is bent, as shown above.

I pass this instrument over the foreign body and can then remove it easily and without any danger. In my time I have extracted a lot of these foreign bodies, mostly from children (since adults do not as a rule push things up their noses), chiefly such things as pearls, peanuts, peas and beans. As all these articles are either polished or soft, it is difficult to extract them with nasal forceps, especially if they have been in the nose for some time. All I need is good illumination and the speculum, and I can then extract foreign bodies from the nose without any danger to the patient.

A Urine Analysis Problem

Query.—To test a urine for albumin I often use salicylsulphonic acid, 25%. Over the past few years I have had a port-wine coloured reaction in one or two specimens. Can you explain this?

Reply.—One reason could be that the patients were taking some rare drug whose excretion product gave a colour reaction with salicylsulphonic acid. Pyridium in the urine is known to give a dark reddish colour on acidification but we are not told whether this or other drugs were being used. Solutions of such drugs should be tested against salicylsulphonic acid though a negative result is not conclusive, for a breakdown product might be responsible.

A simpler and more policeman-like explana-

tion is that the doctor, usually a meticulous urine tester, has on rare occasions put a test-tube aside which he had used for Gerhardt's ferric chloride test for diacetic acid (commonly referred to as 'acetone'). Ferric chloride is often added in excess in this test and is a very persistent substance. If a little should remain and dry out in the tube it would contaminate urine subsequently put in it. This would react with salicylsulphonic acid and give a port-wine colour.

C. ALLAN BIRCH, M.D., F.R.C.P.

PRACTICAL NOTES

Corticosteroids and Fallopian Occlusion

THE use of corticosteroids in the treatment of non-patent Fallopian tubes is discussed by I. I. Kurland and C. H. Loughran (*American Journal of Obstetrics and Gynecology*, February 1961, **81**, 243) who review their own results in 20 consecutive cases, aged 25 to 34 years. All showed repeated evidence of fimbrial occlusion, and one had cornual occlusion. Eighteen had previously received antibiotic therapy on account of 'pelvic inflammatory disease' but were 'in a healed stage'. Patients treated in the initial stage of the investigation were given cortisone acetate: 50 mg. daily by mouth and 50 mg. intramuscularly twice weekly. Later in the investigation treatment was switched to prednisolone acetate: 10 mg. daily by mouth, and 25 mg. intramuscularly. All patients were placed on a salt-free diet, with limitation of fluids. Corticosteroid therapy was given initially for a period of three months to be continued or repeated if required, after an interval of one month. In these 20 cases, total patency was achieved in 11, six of whom conceived. At the time of writing, two of these women had been delivered of normal infants, two were near term, and two were in the early months of pregnancy. Of the remaining nine, two had had less than three months' treatment, and seven were classed as failures. Of these failures, two had had resection anastomoses of the tubes with polyethylene tubing eighteen months earlier. The only side-effect encountered was that two patients showed evidence of œdema—breast engorgement in one, and 'moon facies' in the other—which cleared on withholding treatment.

Antihistaminics in Threatened Abortion

ON the basis of experimental work suggesting that histamines may be responsible for certain cases of abortion, F. Caminiti (*Panminerva Medica*, March 1961, **3**, 122) has investigated the effect of an antihistamine in 29 cases of threatened abortion: 16 in the first trimester and 13 in the second trimester. The antihistamine used was halopyramine. The dosage is not stated, but it was given by intramuscular injection: four injections in the first day followed by two or three injections daily for another four or five days. Treatment was never extended beyond eleven days. No side-effects were encountered. 'On the whole', it is stated, 'the results were quite satisfactory . . . 22 out of the 29 cases (76%) benefited completely from the treatment'. The results were better in those cases occurring in the second trimester (when 92% responded) than those occurring in the first trimester (65%).

Treatment of Stasis Ulcers

AN investigation 'to determine whether healing in stasis ulceration would be quicker and better with a combination of antibiotics and amino acids than with other treatments' was carried out by G. Leslie (*Scottish Medical Journal*, February 1961, **6**, 85). The combined antibiotic and amino-acid preparation used was 'cicatrin' cream, each gramme of which contains 5 mg. of neomycin sulphate, 250 units of bacitracin, 2 mg. of *l*-cystine, 1 mg. of *dl*-threonine, and 10 mg. of glycine. Patients were divided into four groups, one-half of each being treated with 'cicatrin' and the other half by an alternative method: group A, neomycin; group B, neomycin and gramicidin; group C, saline dressings; group D, occlusive dressing (Unna's paste type). In all groups, whether the patients were bedfast or ambulant, the healing time was less in those treated with 'cicatrin'. 'This was most evident in group B, where the main difference between the two preparations was that one contained amino-acids, the other did not'. The trials showed that bed rest is still an important factor in such cases, and that if this is not possible supportive measures to the limb are essential.

Promethazine and Pain

'IRRESPECTIVE of the route of administration promethazine consistently increased the patient's sensitivity to pain and its action was directly opposite to that of pethidine'. Such is the 'some

what unexpected' finding of J. Moore and J. W. Dundee (*British Journal of Anæsthesia*, January 1961, **33**, 3). As they point out, the phenothiazines are widely used preoperatively in combination with analgesics and 'their sedative and tranquillizing properties are considered to be highly desirable'. So much so that there is now a proprietary preparation on the market which contains 100 mg. of pethidine and 50 mg. of promethazine. The evidence in favour of the conclusion reached in this report can be briefly summarized. The intravenous injection of 50 mg. of promethazine in five patients 'resulted in a consistent increase in sensitivity to pain'. The intramuscular injection of 50 mg. 'also demonstrated a high incidence of increases in sensitivity to pain which were detected twenty minutes after administration and persisted for as long as three hours'. When the proprietary preparation, containing both promethazine and pethidine, was injected intravenously (in six patients) and intramuscularly (in 60 patients) there was no obvious effect on the appreciation of pain. In other words, promethazine had apparently antagonized the analgesic action of the pethidine.

Uveitis and Urogenital Infection

AN investigation showing that 'a high proportion of male patients with acute anterior uveitis have chronic urogenital infection and that many of them show changes in the sacro-iliac joints, spine and lower limbs typical of ankylosing spondylitis or Reiter's disease', is reported by R. D. Catterall and E. S. Perkins (*British Journal of Ophthalmology*, February 1961, **45**, 109). Of 226 consecutive male patients attending the uveitis clinic of the Institute of Ophthalmology, four had non-inflammatory lesions such as degenerative choroidal disease and none of these had chronic prostatitis. Eleven had Eale's disease and only one of these had chronic prostatitis (9%). Of the remaining 211 cases of uveitis, 145 (68.7%) had chronic prostatitis. Among the cases of uveitis much the highest incidence of chronic prostatitis was in the 178 acute cases among which the incidence was 84%; in the 33 chronic cases the incidence of chronic prostatitis was only 16%. Of the acute cases, those of anterior uveitis had the highest incidence (80.5%) of chronic prostatitis. Further, a high proportion of the acute anterior cases with prostatitis showed joint changes typical of Reiter's disease (35.5%) or ankylosing spondylitis (23.4%). Whilst these results cannot be taken to mean that acute anterior uveitis is necessarily caused by chronic prostatitis, they do suggest that 'in a large proportion of those cases there is a common etiology' and that 'the uveitis is part of a systemic disease and not a purely local ocular condition'.

Detecting Skin Staphylococci

THE nasal reservoir of virulent staphylococci is well known, but there is a persistent minority of patients with recurrent staphylococcal sepsis in whom staphylococci cannot be detected in the nares. In them, staphylococci may be isolated from the skin. As a means of isolating staphylococci in these nares-negative cases, Mair Thomas (*Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service*, February 1961, **20**, 37) describes a method, making use of sticky tape, for demonstrating the presence of staphylococci and other organisms on different areas of the body. The skin sampling outfit is simply a strip of commercial adhesive film of convenient size—e.g. 1 x 3 inches (2.5 x 7.5 cm.)—carried on a sterile glass slide or mounted on the manufacturer's prepared backing paper. The film chosen must have a suitable pressure-sensitive adhesive surface. 'Artists' Filmolux-Filomatt (Entwistle Thorpe)' is said to be 'the best of those tried so far'. 'Butterfly Brand "Tacky Labels" ' are described as 'cheap and very useful because particulars can be written on the paper label itself', whilst 'Sellotape, Scotch Tape, Speedfix, Transpasene, and Fablon Film are all good'. 'Some P.V.C. stationery and electrical tapes'. however, 'have proved too inhibitory'. To prepare it for use the adhesive strip is turned back on itself at one end for about half an inch (10 mm.) to form a tab by which the film can be held between finger and thumb without contaminating the sticky surface. The mount and strip are cut to fit each other. In use the film is removed from the mount, pressed on to the part of the patient to be examined, pulled off at once, replaced on the mount and sent to the laboratory. There it is again peeled off the mount, pressed briefly on to the surface of a suitable culture plate, and then discarded. The culture is incubated in the usual way. By this method, it is claimed, 'the bacterial flora of the skin can be mapped out, not only qualitatively but to some extent quantitatively'. Further, 'the pieces of tape are easy to use, and are much lighter than tubes and swabs for transmission by post'.

The Scratch Sign

THE 'scratch sign', according to J. D. Lawson (*New England Journal of Medicine*, January 12, 1961, **264**, 88) is 'a valuable aid in the diagnosis of pneumothorax'. It is elicited by placing the Bowles stethoscopic attachment at some *mid-line* position on the chest: either over the spine or sternum. At *equidistant* points from the stethoscope, between 7.6 and 20 cm. from the stethoscope's head, the skin is scratched with a finger or blunt object, and the sounds from the

two areas are compared. A positive sign consists of a considerably louder and harsher sound on the side of the pneumothorax. The difference in sound is attributed to 'high-frequency sound absorption by the subadjacent normal lung of overtones produced by the scratch'. In cases of 'minimal pneumothorax, with only apical retraction', the test is modified by placing the stethoscope at the upper end of the sternum and stroking the supraclavicular areas on both sides.

Penicillinase in Penicillin Reactions

RESULTS of penicillinase treatment in 40 cases of penicillin sensitivity are reported by J. C. Trinca and T. E. B. Keen (*Medical Journal of Australia*, December 17, 1960, **ii**, 973). All had been suffering from an irritating skin condition believed to be caused by penicillin, the duration varying from one day to two years. In 33 the reactions occurred after parenteral administration of penicillin, in two after combined parenteral and oral administration, in two after oral administration and in three after direct contact with penicillin. The penicillinase, which was obtained from the growth of *B. subtilis*, was given by intramuscular injection in doses ranging from 350,000 to 800,000 units. Experience showed that the usual initial dosage should be 800,000 Levy units and the activity is believed to last for four to seven days. This dosage may be repeated if necessary but, in view of the fact that the second dose may be reduced by neutralizing antibodies formed as a result of the first injection, the second dose should be given as soon after the first as possible. The interval between the last known contact with penicillin and injection of penicillinase was two weeks or less in 17 cases but the average was 65 days. The acute and less chronic conditions responded better than those of longer duration: when penicillinase was given within two weeks of the last contact with penicillin, two out of every three cases 'derived considerable benefit' whereas if more than two weeks had elapsed only one patient in three benefited. Some patients were advised to restrict their intake of milk because of the possibility of small quantities of penicillin being present in milk from cows treated with penicillin. The penicillinase caused acute exacerbations of urticaria in two patients and pyrexial reactions in two although this latter reaction was not encountered after the adoption of an adsorption method of purifying the penicillinase. Although side-effects were few 'the possibility of sensitivity to penicillinase should not be taken lightly'. Definite symptomatic improvement within three days with accompanying subsidence of the skin eruption occurred in 50% of the patients and these results 'indicate that penicillinase has a place in the treatment of the delayed type of penicillin reaction'.

Alcoholic Hypoglycæmia

HYPOGLYCÆMIA should be borne in mind in all cases of coma seemingly due to alcoholic intoxication, according to J. Weill and J.-C. Gorouben (*Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 1960, **76**, 1270). Their attention was particularly directed to this condition by the case of a boy, aged 3½ years, admitted to hospital in a deep coma after drinking about 0.25 litre of *vin ordinaire* and who was revived dramatically by the intravenous administration of 20 ml. of hypotonic glucose solution containing 6 g. of glucose. The two factors suggesting hypoglycæmia in this case were the aromatic odour of the breath and, particularly, signs of lockjaw. Surveying the scant literature on the subject, the authors emphasize that in all reports of such cases the patients had ingested alcohol (often in only moderate quantity) after a prolonged fast: e.g., in the early morning. Symptoms varied between those of alcoholic intoxication and hypoglycæmic coma. Acetone was usually present in the urine, the blood alcohol was always less than in true alcoholic coma, and the serum glucose greatly reduced. In no case was there any personal or family history of hypoglycæmia, the symptoms reported being connected solely with the ingestion of alcohol. In view of the fact that alcoholic coma is often treated by the injection of insulin, the importance of looking for symptoms of hypoglycæmia in such cases is stressed.

Salivary Leucocytes in Infants

IN a series of 248 samples of saliva from 10 children, whose ages ranged from 14 days to 4 years, D. E. Wright (*British Dental Journal*, January 17, 1961, **110**, 50) found that 20 samples (82.7%) were completely free from leucocytes. There was a highly significant correlation ($P < 0.001$) between the average count of cells per c.mm. and the age of the child (in months), but no such correlation with the number of erupted teeth. No evidence was obtained to support the popular idea among parents that infants have a superfluity of saliva which might account for these low counts. As is pointed out, 'why there should be so few leucocytes in the early months of life is difficult to understand, particularly when one recalls that there is plenty of evidence for their presence in all samples of adult saliva', where they arise as a result of diapedesis from internal sources across the oral epithelium rather than by way of the salivary glands.

REVIEWS OF BOOKS

Bedside Medicine. By I. SNAPPER, M.D. New York and London: Grune & Stratton Inc., 1960. Pp. 592. Price £5 2s.

BEDSIDE medicine, as Dr. Snapper points out in his preface, is a different thing for each of us. In this book it appears as the bedside medicine of a professor of medicine with a world reputation, who was brought up in a clinical tradition to which he has remained faithful, but who has, nevertheless, been largely preoccupied with teaching and in organizing clinical research. His book consists for the most part of a series of short clinical lectures summarizing his views, theories and the product of his wide reading. Treatment is touched upon but slightly, and clinical methods and their interpretation, which many feel would constitute a major part of a book on bedside medicine if written by themselves, are inconspicuous. What it does give is a really fascinating distillation of Dr. Snapper's experience and thoughts, and as such it is a pleasure for the connoisseur.

It is readable and easy to handle, causing one to turn from section to section with eagerness in order to know what the author thinks about a given subject or point. References to the literature have been deliberately omitted in order to relieve the reader of the burden of many opinions. This is possibly a mistake, as those who will most appreciate this book have minds which are unwilling to accept statements surprising to them without checking their origin. Unusual and valuable features of the text are the author's obvious interest in what is now called geographical medicine, and the wide fields of experience from which his ideas and ideals are drawn. One cannot pick up this book without being glad that the knowledge and influence of its author are being spread by its publication.

Valvular Disease of the Heart in Old Age. By P. D. BEDFORD, M.D., M.R.C.P., and F. I. CAIRD, D.M., M.R.C.P. London: J. & A. Churchill Ltd., 1960. Pp. 194. Illustrated. Price 30s.

THE authors base their observations upon 419 patients, aged 65 and over, with valvular disease found in six-and-a-half years among 3,124 admissions to the Geriatric Unit, Cowley Road Hospital, Oxford. The high incidence of necropsy control strengthens the detailed and lucid discussion. Reading the text one gets the impression of thoroughness and profound search for the truth. The bibliography is particularly useful in tracing original descriptions. Prognosis, always difficult, receives careful attention and it is concluded that no valvular disease *of itself* is of serious adverse prognostic import in an elderly patient, least of all isolated aortic incompetence. The frontispiece shows a fine photograph of the heart of a 96-year-old woman who had no cardiac symptoms from mitral stenosis and free aortic incompetence. Clinicians will find in this book a challenge to renewed effort in diagnosing accurately valvular disease of the heart in old age. This subject required a monograph and it has been well done.

Blood Diseases of Infancy and Childhood. By CARL H. SMITH, M.D. London: Henry Kimpton, 1960. Pp. 572. Illustrated. Price £6 7s. 6d.

THE justification, if one is needed, for a textbook devoted to the hæmatology of infancy and childhood, is the fact that hæmatological disturbances in this age-group must be viewed against a background of the normal blood picture, which in childhood is constantly changing, more particularly so during the neonatal period. The author sets out to do this, although an even greater emphasis on the fundamentals of the subject would have been acceptable. The ground is covered very completely, and the book is commendably up to date, with rapidly developing subjects, such as neonatal hyperbilirubinæmia or the hæmoglobinopathies, well discussed in the light of the most recent knowledge. One of the most important functions of a book of this kind is to provide abundant references to lead the reader to the key articles, both old and new. This aspect is particularly well done. The format is excellent, the subject index is a full one, and the literary style is for the most part reasonably clear.

Few authors of medical books succeed in imparting to them a flavour of their own personalities, and we should have welcomed a somewhat less detached approach, at least towards the more controversial aspects of his subject, than the author has adopted. In summary, a well-produced and useful book.

Transactions of the International Society of Plastic Surgeons, Second Congress, London, 1959. Edited by A. B. WALLACE, M.Sc., F.R.C.S.Ed. Edinburgh: E. & S. Livingstone Ltd., 1960. Pp. 589. Illustrated. Price 90s.

THESE transactions might well be described as 'recent trends', or 'modern developments' in plastic surgery. Such transactions will only be published every four years and it is to be hoped that following the next international meeting

in the United States the same high standards of publication will be maintained. The editor and his associates, together with the publishers, are to be congratulated on having produced a compact volume of high quality. All illustrations are excellently reproduced and to plastic surgeons this volume is packed with interest. The orthopædic surgeon will find an excellent section on the hand. The general surgeon will find much to interest him in sections on cancer, homografts and burns. The ophthalmic section also is not without interest for the specialist in that field.

The general practitioner also would find a glance through this volume rewarding. He might the better appreciate the tremendous strides that have been made in this specialty over the past twenty-five years, note what a wide variety of interests there are in plastic surgery today and, in spite of the controversial nature of many of the contributions in this volume, see how very well worth while are the results generally obtained.

Textbook of Clinical Medicine. Edited by JOHN W. TODD, M.D. London: Pitman Medical Publishing Co. Ltd., 1960. Pp. 564. Illustrated. Price £5 5*s*.

MANY of us in the past have delighted to read Dr. Todd's iconoclastic essays and it is therefore of considerable interest to see how he—together with ten colleagues—sets about compiling his own textbook of medicine. His reason for writing it is (characteristically) that there are serious faults in existing ones, and a principal quarrel is with the pigeon-holing of patients into precisely defined disease groups; this, and others of his *bêtes noires*, are dealt with in the first six chapters. Dr. Todd is at his best in 'Principles of diagnosis', particularly in showing how misleading the single diagnostic label can be. For instance, 'sebaceous cyst' is a quite erroneous description of a patient who is terrified that the swelling is a cancer, as is 'mitral stenosis' for one whose symptoms are those of a superimposed effort syndrome. Nevertheless, he is forced to classify, and conventional chapters on the various systems necessarily follow. Those on the diseases of the alimentary tract and of the biliary system, liver and pancreas, both written by C. F. Hawkins, are exceptionally good, and there is an interesting chapter by John Forbes bringing together infections, dealing not only with details of the various diseases but also their epidemiology.

The reviewer, however, is left somewhat dissatisfied. To him, undergraduates seem to need a more cut-and-dried textbook for recognizing their elephants and they are better taught to see the patient as a total problem at the bedside and in the outpatient clinic. For postgraduates the book is an example of good writing but it does not contain much that they will not already know, and to anyone of experience the views in Dr. Todd's own chapters are rather self-evident. It is as if his earlier insistences had been so successful that a book with them as its main theme is now unnecessary.

Modern Trends in Cardiology. Edited by A. MORGAN JONES, M.SC., M.B., F.R.C.P. London: Butterworth & Co. (Publishers) Ltd., 1960. Pp. 277. Price 70*s*.

THE editor of this latest addition to the 'Modern Trends' series has somewhat arbitrarily, but deliberately, chosen the subject-matter, but he certainly merits no criticism for his choice of authors. All are acknowledged experts in their particular fields and most are British. Perhaps the book will prove of greatest value to the general physician without time to keep abreast of the numerous articles on cardiology which are appearing, and, of course, the ubiquitous Membership candidate cannot afford to ignore it, but even to the every-day cardiologist it will prove a stimulating volume.

Of the sixteen chapters six are devoted to aspects of the coronary circulation in health and disease and these constitute over a third of the book. Particular gems are the sane advice given by Maurice Campbell regarding the medical aspects of cardiac surgery, the account of atrial septal defect by Evan Bedford and Holmes Sellors based on a vast personal experience, and the section, all too short, devoted to the circulatory dynamics of the left heart. The chapter by Gorlin on coronary flow in health and disease is bound to become of increasing importance and constitutes a balanced survey of our present knowledge.

Medical Evidence in Personal Injury Cases. By DOROTHY KNIGHT DIX, Q.C., and ALAN H. TODD, M.S., B.SC., F.R.C.S. London: H. K. Lewis & Co. Ltd., 1961. Pp. 242. Illustrated. Price 42*s*.

THIS book has been written with the very laudable objects of making legal terminology comprehensible to doctors, and to translate the language of doctors into the common tongue for the benefit of lawyers. Both objects have been attained. Unless the reader is qualified in both medicine and the law he cannot fail to benefit from reading this book. It is well produced, adequately indexed, and easy to understand. As a doctor who gives evidence more often in criminal than civil cases the reviewer commends the section on 'Conduct in the witness-box'

Every medical witness should realize that he is a Witness of the Court', and give his evidence impartially. To 'take sides' leads to bias, and bias leads to the witness being discredited which neither helps his case nor his reputation. Two mistakes require early correction. Chapter V, 'Agreed Reports', p. 59, gives the date of resumption of work as November 1955, a date one month after the report was written; and in the glossary of medical terms, p. 232, 'Diplegia' is explained as a 'Paralysis of all four limbs'. The x-ray reproductions between pp. 106 and 107 are not referred to in the text (except by the letters (a) and (b), and might prove confusing to the non-medical reader.

Every medical student should read this book before qualifying, and every house officer keep a copy readily available. It not only gives excellent examples of investigations and reports leading up to a civil action, but stresses the importance of bearing in mind that every injury may become the basis of such an action, and that, apart from the professional skill used in dealing with the injury, adequate notes should be made and retained.

An Approach to Old Age and its Problems. By MARGARET NEVILLE HILL, C.B.E. Edinburgh: Oliver & Boyd, 1961. Pp. 133. Illustrated. Price 15*s.*

THIS is a remarkable account of the author's unique personal experience in the field of the welfare of the elderly. The urgency of the social implications of a population containing an ever-increasing proportion of old people is now generally recognized and this book suggests some of the solutions to the problems. Mental disorders of the elderly have now become of paramount importance and as the recommendations of the Royal Commission on Mental Health are put into effect many more residential homes for mentally disturbed old people will be required. Mrs. Hill's Home, started in 1953, represents a pioneer experiment and she describes its function and purpose. The success of the experiment deserves to be widely known. After relating the history of the services for the aged since the time of the Elizabethan Poor Law up to the dramatic developments of the past twenty years the features of mental and physical ageing in the individual are described. The account of the organization of various types of residential home to meet the needs of particular groups of old people is of considerable interest. The book is intended for the lay public generally, but it will also be of great value to doctors and others concerned with the health and welfare of the aged. Its pleasantly attractive style holds the reader's interest throughout.

Intra-arterial Infusion of Procaine in Therapeutic Practice. By N. K. GORBADEI. (Translated from the Russian.) New York: Consultants Bureau Inc., 1960. Pp. 135. Illustrated. Price $7.50.

INTRAVENOUS infusions of procaine have been used clinically for therapeutic purposes in the U.S.S.R. for over twenty years, but the intra-arterial route of administration has only been used quite recently on a large scale. The author considers that the intra-arterial route is free from the many dangers of procaine infusions intravenously and the differences in the general reactions of the body may be due to differences in the properties of the receptors of the artery and vein. The benefits of intra-arterial procaine are attributed to a modification of the functional state of the nervous system and of the body as a whole. 'The overwhelming majority' of peptic ulcer patients showed rapid disappearance of their pain and vomiting and improvement in their appetite, sleep and general condition. In the treatment of bronchial asthma intra-arterial infusions of procaine are combined with penicillin. Beneficial results are also claimed in the treatment of hypertension, angina pectoris and rheumatoid arthritis. The method of intra-arterial injection of drugs is little known in the West and this book should therefore be of interest to physicians in this country.

Lady Denman, G.B.E. 1884-1954. By GERVAS HUXLEY. London: Chatto & Windus Ltd., 1961. Pp. 205. Illustrated Price 18*s.*

LADY DENMAN's name will always be associated with three organizations: Women's Institutes, the Women's Land Army, and the Family Planning Association. All three owed a tremendous amount to her Yorkshire pertinacity, her inability to take 'no' for an answer, and her generous yet discriminating use of her share of the Pearson millions. She was the daughter of Weetman Pearson, later to become the first Viscount Cowdray. Her mother, of Yorkshire farming stock like her father, took an active interest in her father's business interests and 'was possessed of a driving social ambition'. The result was not a particularly happy home life, even though the parents were devoted to the children. Neither was Lady Denman's married life a particularly happy affair, even though at the age of 26 she found herself the wife of the Governor-General of Australia.

To what extent these various factors played a part in deciding her subsequent triple interests in life, it is difficult to say, but of the debt the three organizations owe to her there can be no

doubt. Her incisive mind, free of all suspicion of sentimentality, could penetrate to the heart of a problem while others were still discussing superficialities. Hard work she threw on, and she would stump the country enthusiastically winning support for her beloved Institutes, her land girls or her birth control clinics. As Mr. Huxley's biography so well brings out, she was a formidable opponent, but the most loyal of friends.

NEW EDITIONS

The Queen Charlotte's Textbook of Obstetrics, by members of the clinical staff of the hospital, in its tenth edition (J. & A. Churchill Ltd., 50*s*.) still has its old format, but includes the advances of recent years. The editing has worked them skilfully into the text and has not just put them at the ends of chapters. Apart from the usual things expected in a book of obstetrics there are good chapters on physiology, the placenta, and maternal emotions. The evolution of the placenta ought to be discarded or, better, improved; the sulphonamides recommended for the treatment of pyelitis are not the best for the job; anuria could be better done.

Midwifery, by Ten Teachers, in its tenth edition (Edward Arnold (Publishers) Ltd., 45*s*.), continues under the editorship of Frederick W. Roques, John Beattie and Joseph Wrigley. The only change this time among its contributors is that Mr. Douglas Macleod has retired and has been replaced by Mr. Robert Percival. Three new chapters have been added to the new edition, including one on blood transfusion in obstetrics and one on vital statistics. The third is an introductory one which scarcely conforms with the high standards we have come to expect of the Ten Teachers. It is a somewhat flippant history of the teaching and practice of midwifery, which should never have been allowed to see the light of day. The new chapter on vital statistics is also somewhat vitiated by the fact that no statistics are provided later than 1955. The bulk of the book, however, remains as good as ever—and this is high praise.

Textbook of Medicine, edited by Sir John Conybeare, K.B.E., M.C., D.M., F.R.C.P., and W. N. Mann, M.D., F.R.C.P., has now reached its 13th edition (E. & S. Livingstone, Ltd., 45*s*.). It is bigger than ever (practically double the size of the first edition, according to the preface), but quantity has not been gained at the expense of quality. Age is taking its toll of the team of authors, but careful revision is being maintained and the book is managing to keep pace with the times. For the student it strikes the happy mean between the short concise textbook and the more elaborate one which he only needs for occasional reference. In the next edition the few misprints among the list of drugs should be corrected, and the list of equivalent doses be brought into line with that of the *British Pharmacopœia*.

Pathology of Tumours, by R. A. Willis, M.D., D.SC., F.R.C.P., in its third edition (Butterworth & Co. (Publishers) Ltd., £5 5*s*.) has undergone the same thorough review as the previous edition. Particular attention in this respect has been given to the many growing points in the subject, such as the experimental production of tumours, syndromes with pancreatic islet tumours, and embryonic hepatic tumours. The author still maintains his somewhat biased outlook on the value of smear diagnosis of carcinoma of the bronchus and of the uterus, but this is probably erring on the safe side. One of the attractive features of this *opus magnum* is the careful selection of references. Although there are said to be 400 additional references in this edition, the author has maintained his proud claim: 'I have adhered to my rule of including only references to works which I have personally consulted'. This is a work which no pathologist can afford to ignore, and clinicians will find it an invaluable source of reference.

Textbook for Midwives, by Margaret F. Myles, S.R.N., S.C.M., H.V. Cert., M.T.D., fourth edition (E. & S. Livingstone, Ltd., 42*s*.).—As testimony to its excellence and usefulness, four editions and three reprints of this comprehensive textbook have appeared since 1953. Written primarily 'for midwives', the term must be interpreted in its widest sense to apply to the pupil, the practising midwife and the midwife teacher. Indeed, the medical student, the general practitioner and the consultant obstetrician could benefit considerably from the instruction, practical and theoretical, which it contains. Much of this new edition has been amended or completely rewritten with the object of clearer and more up-to-date presentation. Emphasis on social and psychological aspects of childbearing, health education and mothercraft is noteworthy, and domiciliary delivery is given special attention. This is a book to be strongly commended to all who are interested in the practice and theory of midwifery, not only in Great Britain but also in the less-developed countries.

The contents of the June issue, which will contain a symposium on 'Disorders of the Hands and Feet,' will be found on page A 142 at the end of the advertisement section.

Notes and Preparations see page 665.
Notes from the Continent see page 669.
Fifty Years Ago see page 671.
World Health News see page A 11.
International Reciprocity see page A 31
Motoring Notes see page A 97.
Travel Notes see page A 101.
Bridge Notes see page A 105.

NOTES AND PREPARATIONS

NEW PREPARATIONS

'AMYLOZINE' capsules each contain 2 mg. of trifluoperazine and 64.8 mg. of amylobarbitone and are intended for use in the control of agitation and insomnia. They are said to be especially suitable in 'chronic agitated psychoneurotics and acutely apprehensive patients whose state of mind is marked by fatigue, insomnia, phobias, vacillation, moodiness and fear'. Available in containers of 30 and 250 'spansule' sustained release capsules. (Smith Kline & French Laboratories Ltd., Welwyn Garden City, Herts.)

'MYDRILATE' solution contains cyclopentolate in Gifford's buffered solution (pH 5), with benzalkonium chloride as a preservative. It is said to produce cycloplegia and mydriasis of rapid onset and comparatively short duration, which can readily be reversed by miotics, and to have little or no effect on intra-ocular tension in the normal eye. The solution is stable at room temperature. Available as a sterile ophthalmic solution in strengths of 0.5% and 1%, in polythene dropper-bottles containing 15 ml. (Ward, Blenkinsop & Co. Ltd., Fulton House, Empire Way, Wembley, Middlesex.)

'ORASTREP' tablets each contain 0.25 g. of streptomycin sulphate base and 0.25 g. of sulphadimidine and are said to exert both local and systemic action 'in all commonly occurring bacterial infections of the intestinal tract'. They may also be used 'prophylactically by those in contact with infected persons'. Available in bottles of 25, 100 and 500 tablets and also as a suspension, each 5-ml. teaspoonful of which contains 0.5 g. of streptomycin sulphate base, 0.5 g. of sulphadimidine and 1.5 g. of light kaolin, in bottles of 50 ml. (Distillers Co. (Biochemicals) Ltd., Broadway House, The Broadway, Wimbledon, London, S.W.19.)

PHARMACEUTICAL NOTES

PFIZER LTD. announce that 'persantin' tablets are available in a strength of 25 mg. and not 12.5 mg. as they originally announced. Issued in bottles of 30 and 200. (Boehringer-Ingelheim Division, Sandwich, Kent.)

PHARMETHICALS (LONDON) LTD. announce that single-ampoule packs of their contrast media, 'biligrafin', 'endografin' and 'urografin' (all strengths), are no longer available. (Victoria Way, Burgess Hill, Sussex.)

ROYAL SOCIETY OF MEDICINE

THE Annual General Meeting of the Section of General Practice will be held at 8.15 p.m. on May 17, when the speaker will be Sir George Schuster, Chairman of the Oxford Regional Hospital Board. The title of his address will be 'Cooperation between General Practitioners and the National Hospital Service'.

FORTHCOMING CONFERENCES

THE *Second Middle Eastern-Mediterranean Pædiatric Congress* will be held in Ankara from September 6 to 9, 1961. Full details may be obtained from the Secretary General, Hacettepe Çocuk, Ankara, Turkey.

Stroke Rehabilitation will be the subject of a one-day conference to be held on June 22, 1961, in the Livery Hall, Guildhall, London, E.C.2. The conference is open to 'everyone concerned in the treatment and rehabilitation of the "stroke" patient, including his family'. Full details may be obtained from the Chest and Heart Association, Tavistock House North, Tavistock Square, London, W.C.1.

HUNTERIAN SOCIETY GOLD MEDAL

THE subject for the Hunterian Society's Gold Medal Essay Competition for 1961 is 'The Management of Diabetes Mellitus in General Practice'. The competition is open to all general practitioners resident within the British Commonwealth, and further details may be obtained from the Honorary Secretary, Dr. O. Garrod, M.B.E., 31 Weymouth Street, London, W.1.

THE WELLCOME TRUST

THE third report of the Wellcome Trust, covering the period, 1958-1960, opens with a well-earned tribute to Sir Henry Dale, who retired in July 1960 after having been chairman of the Trust for twenty-two years. He has been succeeded by Lord Piercy. During the period covered by this report the trustees have allocated grants to a total of approximately £1.2 million. These have ranged from building grants, such as that for £120,000 to the department of biochemistry in Cambridge University, to numerous research fellowships. The grants have by no means been restricted to Britain, and generous allocations have been made to the United States as well as Canada and other members of the Commonwealth. One of the more unusual grants was that of £12,500 to Makerere Medical College, Kampala, Uganda, for the provision of a mobile laboratory unit for use in comparative physiological studies involving some of the larger fauna of tropical Africa

CARE OF THE AGED

THE annual report of the National Corporation for the Care of Old People, for the year ended

September 30, 1960, includes the following statement on the advisability of setting up special health clinics for old people: 'The Corporation's views are that it would be a retrograde step for these clinics to be set up in isolation and with no links with general practitioners, geriatric units and other services for old people. Whether such clinics can play a useful part in helping old people to remain independent, whether they should give treatment or only advice and whether indeed they should be a local authority responsibility at all are matters for discussion and experiment. But it seems important to emphasize that if a suitable method of operation is to be found for these clinics it must include the general practitioner who, as in most services for the old, can, by his experience and knowledge of his patients, provide the key to success'.

OCCUPATIONAL GENITO-URINARY TUMOURS

THE March issue of the *British Journal of Urology* contains a statement on 'Occupational Tumours of the Urinary Tract', which has been issued by the British Association of Urological Surgeons. Described as 'a guide to urologists and surgeons' it provides an admirably concise and authoritative review of the problem, including the statutory and other benefits available to patients in this category, and also a list of the names and addresses of H.M. Inspectors of Factories. Reprints (price £3 per 100 copies post free) are available on application to E. & S. Livingstone Ltd., 15-17 Teviot Place, Edinburgh, 1.

MARRIAGE IN 1959

IN England and Wales there were 340,126 marriages in 1959, giving a rate of 14.9 persons marrying per 1000 population, according to the recently published Registrar General's Statistical Review for 1959. The most common age for marriage is still 21 for women and 22 for men, and March continues to be the favourite month for marriage, followed by September and August. The least popular months were January and November. There were 30,252 marriages where both bride and bridegroom were under 21, and of the 65 brides under 21 who had been previously married, 31 were widows and 34 had been divorced. Divorce decrees made absolute numbered 24,286, which represents a rate of just over 2 per 1000 married couples. The husband was granted a decree in 10,951 cases and the wife in 13,249, the difference being almost entirely accounted for by divorces on the grounds of cruelty. Of the decrees granted to one party on one ground, 10,989 were granted on the grounds of adultery (5,920 to the husband and 5,069 to the wife), 7,859 for desertion (3,913 to the husband and 3,946 to the wife) and 3,193 for cruelty (282 to the husband and 2,911 to the wife).

Illegitimate births numbered 38,161, and accounted for 5.1% of all births. The number of adoptions registered under the Adoption Act was 14,109, the highest number since 1949. The number of boys adopted (7,189) again exceeded the number of girls (6,920). About 34% of the children were adopted by relatives.

SCOTTISH STATISTICS

ALTHOUGH the expectation of life at birth in Scotland in 1960 was 66.4 for males and 71.9 for females (compared with 40.3 and 43.9 in 1860), the expectation of life among middle-aged men in 1960 is little better than it was twenty-five years ago, according to the annual report of the Department of Health for Scotland for 1960. The other depressing point brought out by the report is that the death rate from bronchitis in Scotland remains among the highest in Europe.

On the administrative side, it is reported that about 79% of doctors have fewer than 2,500 patients on their lists, and that there is no general shortage of nurses. An analysis of how each £1 was spent in hospital and specialist services shows:

Nursing salaries	5s. 4d.	Total salaries and wages 12s. 1d.
Domestic, catering and other staff wages	4s. 8d.	
Medical salaries and fees	2s. 1d.	
Food, drugs, services, maintenance, fuel, and administration	7s. 11d.	

ANTI-ALCOHOLIC DRUGS

ONCE again, in view of the Government's refusal to safeguard the public, the Pharmaceutical Society has had to step into the breach. At a recent meeting the Council of the Society approved the following statement: 'The attention of the Pharmaceutical Society has been drawn to a preparation on sale to the public which, it is claimed, will counteract the undesirable effects of alcoholic beverages. In view of the possibility of misuse, with consequent danger to the public, the Council advises pharmacists not to stock or sell any preparation for which such a claim is made'.

SAFETY HAZARDS

AMONG the hazards on which a special safety committee of the British Standards Institution want action to be taken are fireguards wh[ich] don't do their job properly—the Commi[ttee] deplore the fact that few shops stock Ki[temarked] guards which fix firmly to the firepl[ace]

surround and cannot be knocked over by children. Other articles needing revised safety standards include flammable fabrics, electric blankets, electric pokers and push-chairs.

Because of the frequency with which, apparently, the 'switch-off before you go to sleep' instructions are ignored, it is reported that the British Standard for electric blankets is being revised to provide for some models which can be left on all night in safety. In the case of lightweight prams and push-chairs, the safety standards required are to ensure that they will not topple over, that adequate brakes are fitted, and that children cannot catch their hands in folding types.

V.D. IN U.S.A.

THERE has been an 87% increase in infectious syphilis in the United States between 1958 and 1960: i.e. from 6,661 to 12,471. It is estimated that the number of teenagers contracting venereal disease in 1960 was around 250,000. In view of these facts and figures the Government is being urged to provide $10 million (£3.57 million) for a 'massive programme' to fight venereal disease.

PLANTAR WARTS

THE most satisfactory method of treating plantar warts in children is 'chlorosal', according to Dr. Robert Mitchell, principal school medical officer for Burton-on-Trent. Three or four applications are usually sufficient. 'Chlorosal' contains 5% of chlorhydrate, 60% of salicylic acid, and 35% of white soft paraffin.

THE HUMAN BITE

A DENTAL research conference in Boston was recently told of the invention of a tooth-size radio transmitter to be worn in the mouth to measure the human 'bite'. The suggestion was also thrown out that it might have military application, in that its wearer could transmit morse code without detection.

STERILIZATION IN INDIA

ACCORDING to a report in *News of Population and Birth Control* (April 1961), which is published by the International Planned Parenthood Federation (I.P.P.F.), 'a highlight' of the fourth All India Family Planning Conference held earlier this year was a paper on sterilization by Dr. G. M. Phadke, honorary director of the Family Planning Association of India and a member of the I P.P.F. governing body. Dr. Phadke reported that 14,000 male sterilizations had been performed in vasectomy camps in the State of Bombay within a period of six weeks. For both sexes there are criteria of eligibility for sterilization which vary from State to State. In some States a man is offered 30 rupees as an inducement to undergo the operation, with a further 10 rupees for each friend that he brings in to be sterilized.

A GUNSHOT WOUND *IN UTERO*

THE case of an infant who received a gunshot wound *in utero* ten weeks before birth—and survived—is reported by N. Stuart Geggie (*Canad. med. Ass. J.*, 1961, **84**, 489). The mother, aged 25, para IV, gravida XII, shot herself in the abdomen when she was approximately 25 weeks pregnant. She was admitted to hospital where she stayed for ten days without treatment. A month later (May 26) she came under Stuart Geggie's care, complaining of weakness in the right leg, intermittent vaginal bleeding and a weight loss of 11 kg. On examination, the uterine fundus was palpable at the level of the umbilicus, there were obvious fœtal movements but the fœtal heart was not heard. There was no vaginal bleeding, but a yellow-brown vaginal discharge. There was a small scar to the left of the umbilicus, and x-rays revealed fragments of the bullet adjacent to the right iliac bone. Although there was intermittent vaginal bleeding, the patient refused to take any medical advice.

On July 29, she was admitted to hospital in labour and found to have a breech presentation. She was delivered, without difficulty, of a male baby who weighed just under 6 pounds (2.7 kg.). The baby was found to have an unhealed superficial wound, 8 cm. long, over the left scapula. He developed a mild degree of jaundice, and was transfused with 100 ml. of blood on the third post-partum day, but was finally discharged home well on August 15.

HYPOGLYCÆMIC PLANTS

THE search for oral hypoglycæmic agents is now producing a plethora of such agents. M. Sendrail and his colleagues (*Sem. Hôp. Paris*, 1961, **37**, 389) have investigated the effect on the pancreas of fluid extracts of *Galega officinalis* (goat's rue), bilberry, burdock, mulberry and walnut administered orally to guinea-pigs. All of them, but especially bilberry and galega, produced marked changes in the pancreas and in blood-sugar levels. Although there was no definite correlation between the dosage, the changes in the pancreas, and the alteration in blood-sugar, there was no doubt about the profound changes produced in the islets of Langerhans, and it is suggested that this is a matter deserving further investigation.

PUBLICATIONS

Relaxation for Childbirth, by Mary Barfield, M.PHYS.A.—This small book, written by a physiotherapist, describes the methods she

uses in regard to relaxation during labour. Much of the information is extremely useful and quite well presented. On the other hand, some of the statements which are presented are dogmatic and open to doubt. The suggestion throughout is that if relaxation is carried out correctly then there will be virtually no pain during labour. Undoubtedly relaxation is of tremendous value during labour, but it is probably misleading to suggest that it must inevitably relieve all pain. This book will prove interesting reading to mothers and physiotherapists. It is a pity there is not more evidence for many of the claims which are made. (William Heinemann Medical Books Ltd., price 12*s.* 6*d.*)

The Medical Directory 1961.—The 117th annual issue contains 95,740 names—an increase of more than 2,500 compared with the previous issue. After so many years most of us take the 'Medical Directory' so much for granted that its high standard and comprehensiveness may not always be appreciated. As always, the publishers are to be congratulated on the production of these volumes. (J. & A. Churchill Ltd., price £5.)

The Medical Directory of South Africa 1960-61 is the first book of reference giving information on the medical profession in South Africa. In addition to lists of practitioners and consultants it includes details of medical schools, periodicals and an index to hospitals. (Knox Publishing Co., Durban, price £2 2*s.*)

Medical Radiographic Technique, edited by Glenn W. Files.—The second edition of this book is a welcome addition to radiological literature. It is comparatively brief, but covers adequately all the main aspects of radiological technique, and has a useful brief explanation of radiological physics, which is essential to the understanding of radiography. The anatomical diagrams are also excellent, and all the illustrations and diagrams are of high quality. This is a book that can be recommended for those who need a brief reference book on the subject. (Blackwell Scientific Publications, price 82*s.* 6d.)

The Health of Executives is the transactions of the second conference on this subject held last November under the ægis of the Chest and Heart Association. (Chest and Heart Association, price 15*s.*)

Family Welfare Centre, by Nancy Lingard, Margaret Platt, M.B., D.P.M., and Barbara Oldham, M.B., is a short history of the Family Welfare Centre in Manchester, founded by the late Lady Jefferson. (Published for private circulation by the Family Welfare Centre, Manchester, 13.)

Every Man Our Neighbor, by Joseph E. Garland, is an attractively written, and attractively produced, short history of the Massachusetts General Hospital, which has just been celebrating the 150th anniversary of its foundation. Its charm is enhanced by the intense familial pride which the author can take in his subject—his great-grandfather, grandfather and father have all been associated with the M.G.H., and his mother was a nurse there. When it is added that his father's name is Joseph Garland, the discriminating reader will immediately appreciate that this is a Bostonian best. (Little, Brown & Co.).

The Story of Hospital Almoners, by E. Moberly Bell, is a short, well-told, account of the development of the almoner service in this country. Inevitably, much of it is taken up with the activities of Miss Anne Cummins at St. Thomas's Hospital. The history of hospital almoners is a curiously mixed one. From a comparatively early stage their work was bedevilled by the demands put upon them to collect money from patients. Even the genius of Miss Cummins could not quite overcome this incompatibility of purposes. Today, however, all is at last well and the almoner is established as an integral part of the hospital system. (Faber & Faber, price 13*s.* 6*d.*)

Smoking—A Message from an MOH, by Dr. J. L. Burn, Medical Officer of Health of Salford, is a booklet intended for 'people who like to read the facts for themselves' and particularly the intelligent teenager. (Chest and Heart Association, price 2*d.*)

The Adolescent contains observations arising from discussions among members of the British Medical Association on the Association's first 'subject of the year', for 1959-60. The subject was 'The Medical Aspects of Adolescence', and the report incorporates the views of twenty-four divisions of the association, representing 2,250 members. (British Medical Association, price 2*s.* 6*d.*)

Getting Married 1961 can be recommended for any engaged couple who have not been able to solve their problems by the old-fashioned method of seeking first-hand advice from those who know. It is a *Family Doctor* 'special'. (British Medical Association, price 1*s.*)

Corrigendum.—Sandoz Products Ltd. have asked us to state that the British name of their preparation 'UML-491' (1-methyl-D-lysergic acid butanolamide), mentioned in Practical Notes on p. 402 of our March issue, is 'deseril' and not 'palerol'.

NOTES FROM THE CONTINENT

A European Newsletter

BELGIUM

Head injuries in children.—In a review of the subject, Dr. Fr. Moyson, the director of the university clinic for child surgery and orthopædics in the University of Brussels, and Dr. Jeanty point out that, next to fractures of the forearm, head injuries constitute the most common accident in children: they are responsible for one-third of infant deaths. Stress is laid upon the importance of localizing the lesion at as early a stage as possible, and for this purpose the authors recommend cerebral angiography in every case with neurological signs. Equally important are the electrolytic disturbances and their management, and in many cases tracheotomy is necessary. Finally, a word of warning is given about the use of 'hibernation' in children with head injuries—it must be used with great discrimination.

An efficient vasodilator.—According to W. Cloetens and his colleagues, phenetamine (1 - phenyl - 1 - cyclohexyl - *bis*[diethylamino] butanol) is a useful preparation in the treatment of Raynaud's disease. They describe it as an active vasodilator—i.e. a parasympathetic substance with a cholinergic action—which has relatively few side-effects. It is also said to be of value in relieving the reactionary vasoconstriction which may occur in the peripheral arteries following sympathectomy or arterectomy. From this point of view therefore it is of value in preventing the postoperative thrombotic complications of vascular surgery.

Treatment of persistent pain.—Attention is drawn by J. Brihaye and J. Retif, of the neurosurgical clinic of the Free University of Brussels, to the value of antero-lateral chordotomy in the relief of intractable pain due to gynæcological malignant conditions. They report their findings in 81 cases in which this operation was performed, in 53 of which it was carried out in the cervical region. As a result of this they conclude that section of the spino-thalamic tract is a most useful method of relieving intractable pain due to malignant lesions. In their series, it proved effective in 80% of cases with pain in lower limbs and abdomen, and in 65% of cases with thoracic pain or pain in the upper limbs. The total mortality in their series was 8.6%, being highest in those submitted to bilateral chordotomy.

In spite of this higher mortality rate, bilateral chordotomy is considered necessary for effective relief of pain in patients in whom central organs of the body, or organs with a bilateral sensory innervation, are involved. This applies even though the pain is unilateral in distribution. Cervical chordotomy is preferable to thoracic chordotomy as the results are better and there are fewer complications. Motor and sphincter disturbances are said to be temporary, and to be less common after unilateral cervical chordotomy.

Cardiac output in cardio-respiratory insufficiency.—As a rule, according to Professor Lequime and Dr. M. H. Denolin, of the University of Brussels, in a paper read before the Royal Belgian Academy of Medicine, in chronic pulmonary disease a significant increase in cardiac output only occurs when the arterial oxygen-saturation falls below 80%. Even in such circumstances there are instances when the cardiac output is not increased—and may even be diminished. The factors responsible for this anomalous state of affairs include increased pulmonary vasoconstriction, advanced heart failure and increased blood volume.

Following the intravenous injection of digitalis in a patient with emphysema and right heart failure there is an increase in the cardiac output—even when the latter was already increased before the injection. This is taken to mean that in such cases the original rise in cardiac output was not sufficient to meet the metabolic needs of the body. When circulatory recompensation is achieved and the anoxæmia disappears, the cardiac output returns to normal. In a patient with emphysema without cardiac insufficiency, or in whom the insufficiency is compensated, the response of the cardiac output to exercise is normal. In the presence of cardiac insufficiency, however, the cardiac output is not increased sufficiently to cope with the increased demands: this is what happens in advanced stages of the disease.

GERMANY

People and their leisure.—A recent gallup poll shows that more people spend their leisure reading than doing anything else. In reply to the question, 'How do you prefer to spend your free time', 30% said reading. This was closely followed by handicrafts and gardening (24%). Sport was the answer of 11%, and 6% gave 'art, music and science' as their spare-time occupa-

tions. Only 2% mentioned religious and church work. Handicrafts and gardening were the most popular choice among women, and walking, hobbies and sport among men. A break-down of the answers according to age showed that reading was the dominant interest in all age-groups (16-25, 25-50, 50 and older). Sport was the selection of choice by 33% of the youngest group, 10% of the middle group and 3% of the oldest group.

'Caval catheterization' for long-term infusions.—According to H. W. Opderbecke and E. Bardachzi, thrombophlebitis can be expected as a complication of 50% of transfusions which run for twelve hours or longer. If the transfusion lasts for three days or more the complication rate becomes much higher. To overcome this hazard they recommend the use of infusion into the vena cava. Incidentally, it was for this purpose that Forssmann first started investigating cardiac catheterization. The advantage of caval catheterization is that the intima is no longer 'directly' attacked by the unphysiological nature of the infusion solution. The only trauma to which it is exposed is that of the indwelling catheter. Polyethylene is said to be best for this purpose, although recently nylon has been recommended because it is easier to sterilize. Polyvinyl chloride is contraindicated because it contains so-called 'softeners' which diffuse out of the material and in the course of a prolonged transfusion may damage the intima.

The principles laid down for successful caval catheterization are: (i) Only the veins of the upper limbs—preferably the basilic vein—should be used. (ii) Strictly sterile precautions must be observed. (iii) Antibiotic cover must be provided for the duration of the infusion. (iv) The position of the catheter must be controlled radiologically. The authors claim that in 150 cases in which they have used caval catheterization they have encountered complications in only two cases—and neither of these was serious.

Reducing intracranial pressure.—R. Hemmer, of the neurosurgical unit of Freiburg University Hospital, has compared the effect upon raised intracranial pressure of concentrated solutions of fructose, glucose, saccharose, invert-sugar, sorbitol, mannitol and urea. Of all these, 40% fructose, 30% sorbitol and 30% urea were the most effective. The effect of glucose was not found to be as great as has been reported. Following the administration of 40 ml. of 40% fructose there was a 27% fall in intracranial pressure within eleven minutes, and this was maintained for three-quarters of an hour. Although 30% sorbitol produced a satisfactory fall in intracranial pressure, it is liable to lead to heavy diuresis and this may lead to dehydration and the associated electrolytic disturbances.

Head injuries.—In spite of all the improvements in diagnostic and therapeutic measures, such as hypothermia and the use of corticosteroids, head injuries still carry a mortality of 50 to 70%, according to W. Tönnis and R. A. Frowein. Emphasis is laid upon the necessity of dealing with any respiratory disturbances as soon as possible, and mechanical obstruction to respiration should be dealt with at the scene of accident, when possible. Traumatic hæmatomas should also be drained as soon as possible. In coma lasting up to one week full recovery can be expected in about two-thirds of cases, but when coma persists for more than four weeks there is practically always some permanent neurological and psychical damage. When unconsciousness persists for more than three months recovery is completely ruled out.

Chemolysis of renal calculi.—Since 1959 M. W. Brozinski and his colleagues have been investigating the effect of ethylenediamine tetra-acetic acid and its disodium salt in dissolving oxalate renal calculi. Their original experiments were carried out on calculi removed surgically, and these showed that a stone weighing 1.3 grammes could be dissolved in 100 hours.

They then switched to attempts to dissolve the stone *in situ*. This was done by means of irrigating the renal pelvis for eight to ten hours daily. The irrigating sound, made of artificial resin, was introduced into the renal pelvis with the aid of cystoscopy and its position checked radiologically. It was left *in situ* for periods of up to seven weeks. The temperature of the solution was kept constant at 37° C., and the speed of the 'drip' was 60 to 80 drops a minute. A more rapid flow can be obtained by the use of a suction pump and producing a vacuum of 60 mm. Hg.

It is reported that as a rule patients tolerated the irrigation without much discomfort. Some, however, complained of a sensation of pressure in the renal area, and it is suggested that this may be due to tension of the renal capsule. The preliminary results indicate that the rate of dissolution *in situ* is much slower than *in vitro*, but the hope is expressed that these investigations may lead to the successful non-surgical treatment of renal calculi in the foreseeable future.

'Notes from the Continent' are produced in collaboration with the Editors of *Bruxelles Médical* (Belgium), *Le Concours Médical* (France), *Münchener Medizinische Wochenschrift* (Germany), and *Minerva Medica* (Italy).

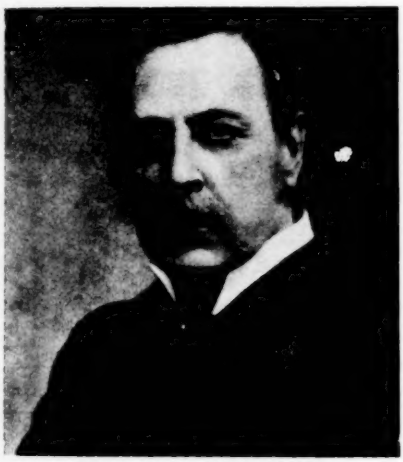
THE PRACTITIONER

Fifty Years Ago

'Constancy of position is not a virtue of viscera.'
Sir John Bland-Sutton: *Misplaced and Missing Organs.*

MAY 1911

'MEDIASTINAL GROWTHS', writes Sir Richard Douglas Powell, Bt., K.C.V.O., M.D., LL.D., Consulting Physician to the Middlesex Hospital and Emeritus Lecturer on Medicine, in his clinical lecture 'On mediastinal growths', 'are, in practice, comparatively rarely met with, so



W. Bruce Clarke, M.B., F.R.C.S.
(1850-1914)

that their occurrence is apt to take us by surprise'. The practitioner's responsibility is grave, because 'given mediastinal growth as a certain diagnosis, the prognosis is absolutely fatal' and 'there must be very sure grounds for announcing practically that the patient is going to die within two or three months'. Discussing treatment he points out that 'if we were to fold our hands when we meet with limitations in the possibilities of curing our patients, we should miss our vocation', and in dealing with the distress and dyspnœa which characterizes the later stages, he writes: 'Two or three grains of iodide of sodium and five to seven grains of chloral, given every three, four or six hours, undoubtedly do give relief to the dyspnœa'.

In 'Some anomalous and obscure symptoms associated with movable kidney', W. Bruce Clarke, M.B., F.R.C.S., Senior Surgeon and Lecturer on Surgery, St. Bartholomew's Hospital; Member of the Council of the Royal College of Surgeons, describes a variety of digestive troubles attributable to movable kidneys. 'Many movable kidneys are productive of no harm and may remain undiscovered for years, but if obscure abdominal symptoms are present, particularly if they are associated with the pylorus, the liver, or other neighbouring organs, the right kidney should be made the subject of careful investigation'. Operations sometimes afford no relief, he says, and often this is due to failure to realize that movement of the mobile kidney has lengthened the ureter, which must be fully extended when the kidney is fixed.

Born at North Wootton, Norfolk, where his father was rector, William Bruce Clarke was educated at Harrow and at Pembroke College, Oxford, where he obtained a first class in natural sciences and a Burdett-Coutts University Scholarship. Proceeding to St. Bartholomew's Hospital Medical School, he qualified M.R.C.S. in 1877, obtaining the Oxford M.A. and M.B. in the same year. Promotion was slow and, though he became assistant surgeon in 1883, he had to wait until the retirement of Mr. (later Sir Henry) Butlin in 1903 to become full surgeon. He had obtained the F.R.C.S. in 1879 and in 1885 had been awarded the Jacksonian Prize for his essay on 'Diagnosis and Treatment of Diseases of the Kidney Amenable to Direct Surgical Interference'. He was surgeon to the West London Hospital and to St. Peter's Hospital for Stone. Senior Surgeon at Bart's in 1910, he became Consulting Surgeon on his retirement in 1912. Clarke examined for the Royal College of Surgeons of England and was a member of the Council from 1907 to 1913.

A bold and rapid operator, he regarded few cases as too difficult for surgical intervention, and sometimes obtained brilliant results in desperate situations. His enthusiasm for the 'carpentry' of surgery gave him special interest in orthopædics. Leisure hours were devoted to amateur joinery and motoring. He wrote a 'Handbook of Surgery of the Kidneys', 1911. Colleagues, students, and patients appreciated his manly qualities, kindliness, and humour. Many stories were told of him, of which the following is typical. Once when setting out on a railway journey he fell from the hansom cab on to the station and cut his lip. Happening to have an ordinary sewing needle and some

thread in his pocket, he went straight to the station waiting-room and sewed up the wound in front of the waiting-room looking glass.

Were it not for the phraseology, the concluding paragraph in the article on 'Some Observations on the Use of Guipsine as an Apressor Remedy in Cases of High Arterial Blood-Pressure', by O. K. Williamson, M.D., F.R.C.P., Physician to the City of London Hospital for Diseases of the Chest, Victoria Park; Physician to Outpatients at the Hampstead General Hospital; Assistant Physician at the East London Hospital for Children, Shadwell, might very well have been taken from a current article on the subject: 'In conclusion, I venture to submit that the foregoing records show that in guipsine the physician possesses an effective and safe remedy, in addition to those already in vogue, for the treatment of cases of supernormal arterial pressure'. Guipsine is described as 'a drug obtained from mistletoe (*Viscum album*)'.

There is an equally modern ring about the footnote appended to the article on 'Modern Views on the Causation and Treatment of Mucous Colitis', by Francis Hernaman-Johnson, M.D., Ch.B., R.N.(Retd.), Radiographer to the Bishop Auckland District Hospital, Durham; late Surgeon, Royal Naval Hospital, Plymouth. The footnote is pertaining to a section dealing with the treatment of mucous colitis by sea-water injections, and it is as follows: 'Through the courtesy of Dr. Mark Wardle I have been permitted to observe the effect of sea-water injections in several cases of skin disease at the Auckland Union Infirmary. The results are so strikingly similar to those which I am accustomed to see as a result of x-ray treatment, that I am at present experimenting with sea-water to ascertain if any radioactivity can be discovered by the usual physical methods'.

'To attempt to say anything new or interesting upon such a well-worn theme . . . is rather a daring thing to do', writes E. Stanmore Bishop, F.R.C.S., Hon. Surgeon, Ancoats' Hospital; Consulting Surgeon for Diseases of Women, Victoria Jewish Hospital; President, Manchester Medical Society; Ex-President, Clinical Society, Manchester; Member, Council Royal Society of Medicine, Obstetrical Section, in his article on 'Appendicitis'. 'Since our late honoured King presented himself as an object lesson on the subject . . . the man in the street considers himself all-but as great an authority as any of our most learned professors'. On the question of 'interim' operations he writes: 'One undeniable fact must always be kept in mind. The "interim" operation, *i.e.* the one undertaken when no acute inflammatory changes are in progress, is practically without any mortality at all'.

According to a 'Practical Note' on 'Some new remedies for the treatment of chronic cardiac insufficiency': 'It is a great gain to have such drugs as strophanthus, apocynum, and the like when digitalis fails . . . iodine and camphor can be of the utmost use when the heart no longer responds to preparations of digitalis'. T. H. B.

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